ATTACHMENT 1
DAAE07-XX-X-XXXX

ATPD 2131C, DATED 20 Feb 03
SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

SYSTEM SPECIFICATION
FAMILY OF MEDIUM TACTICAL VEHICLES (FMTV) - A1

1. SCOPE.

1.1. Scope. This system specification identifies the physical, performance and inspection requirements for the third generation of the Family of Medium Tactical Vehicles (FMTV). The system specification establishes these requirements by identifying the following:

a. Technical data requirements from which the vehicle is to be produced.

b. Physical characteristics and performance requirements for the vehicles produced.

c. Identification of the performance and quality test requirements used to verify the vehicles meet the specified performance standards.

The Technical Data Package (TDP) identifies specifications and installations at a component level. The TDP does not identify the performance requirements of the final assemblage of these components at the system level. The physical characteristics and performance requirements are identified by this specification. Therefore, this specification will form the basis for establishing and evaluating the vehicle's physical characteristics and performance.

1.2. General Description. The new generation of FMTV represents the third stage of FMTV evolution. Like the basic FMTV, these vehicles are comprised of many common components and consist of light and medium vehicle, including trailers. It covers a family of diesel-engine-driven, automatic-shift transmission, radial-tired, all-wheel-drive trucks. The light version vehicle, the LMTV, must accommodate a minimum 5,000-lb (2,268-kg) payload and a 12,000-lb (5,443-kg) towed load. The standard or medium version, the MTV, must be capable of transporting a minimum 10,000-lb (4,536-kg) payload and a 21,000-lb (9,526-kg) towed load. These vehicles must be capable of operating under on-road/off-road conditions and withstand the strain, shocks, vibrations and other detrimental conditions incident to off-road travel and operation. The vehicle will be capable of meeting all characteristics specified herein throughout a life-cycle-mileage profile consisting of 20% primary road, 50% secondary road, 15% trail, and 15% cross-country operations while carrying a 3-person crew and specified loads. Some major change for the vehicles include:

a. 2004 EPA-certified diesel engines
b. Automatic transmission
c. SAE J1708 and J1939 data bus
d. Anti-lock Brake System (ABS)

1.3. Vehicle Variants. The third generation FMTV variants are described as follows:

MODEL	NOMENCLATURE
M1078 A1	TRK, CARGO, LMTV
M1079 A1	TRK, VAN, LMTV
M1080 A1	TRK, CHASSIS, LMTV
M1081 A1	TRK, CARGO, AIR DROP, LMTV
M1082	TRAILER, CARGO, LMTV

M1083 A1	TRK, CARGO, MTV
M1084 A1	TRK, CARGO, MTV, W/MHE
M1085 A1	TRK, CARGO, LWB, MTV
M1086 A1	TRK, CARGO, LWB, MTV, W/MHE
M1087 A1	TRK, EXPANSIBLE VAN, MTV
M1088 A1	TRK, TRACTOR, MTV
M1089 A1	TRK, WRECKER, MTV
M1090 A1	TRK, DUMP, MTV
M1092 A1	TRK, CHASSIS, MTV
M1093 A1	TRK, CARGO, AIR DROP, MTV
M1094 A1	TRK, DUMP, AIR DROP, MTV
M1095	TRAILER, CARGO, MTV
M1096 A1	TRK, CHASSIS, LWB, MTV
	HIMARS RSV
	LHS TRUCK
	LHS TRAILER

2. APPLICABLE DOCUMENTS

2.1. Government and Commercial Specifications, Standards, and Handbooks. Specifications, standards, commercial item descriptions, drawings, and handbooks cited herein form a part of this specification to the extent indicated. Unless otherwise stated, the issue of the documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplements in effect on date of contract award.

2.2. Commercial and Government Documentation.

2.2.1. Commercial or Industry Standard and Publications.

Commercial Item Descriptions (CIDs)

A-A-50271	Plates, Identification, Instructions, and Markings
A-A-52426	Hose & Hose Assy's, Non-Metallic, Silicone, Polyester and Wire-Reinforced
A-A-52474	Electro-coating Primer
A-A-52483	Plate, Identification: Emergency & Service Auto Air Brake
A-A-52484	Coupling, Automotive: Air Brake Lines
A-A-52507	Chain Assembly, Single Tire Type TS
A-A-52513	Bracket Ass'y, Liquid Container – Five Gallon
A-A-52557	Diesel Fuel
A-A-52624	Antifreeze, Multi Engine Type
A-A-59294	Starter, Engine Electrical 24 Volt Direct Current

American Conference of Governmental Industrial Hygienists (ACGIH)

American Society for Quality Control (ASQC)
ASQC-A8402 Quality Management and Quality Assurance-Vocabulary

Standardization NATO Agreement (STANAG)

ABCA Quadripartite Standardization Agreements
QSTAG-244 (S)

General Motors

GM9984017 E-Coat Primer
GM9984070 E-Coat Primer

National Highway Safety Administration

Federal Motor Vehicle Safety Standards (FMVSS) 101, 102, 106, 108, 111, 119, 120, 121, 124, 205, 206, 209, 210, and 302 in particular, and all standards, at time of award, appropriate to vehicles of the types described herein.

Department of Transportation

Federal Motor Carrier Safety Regulations (FMCSR) 393.27, 393.28, 393.29, 393.30, 393.31, 393.32, 393.33, 393.67, 393.70, 393.80, 393.83, and 393.86

(Application for copies should be addressed to the Dept. of Transportation, Federal Highway Administration, Washington, DC 20591.)

Code of Federal Regulations

49 CFR Tiedowns

Environmental Protection Agency

Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines.
Compliance with Interstate Motor Carrier Noise Emission Standard.

(Application for copies should reference Code of Federal Regulations 49CFR and the Federal Register, and should be addressed to the Superintendent of Documents, US Government Printing Office, Washington, D.C. 20402.)

SAE Standards And Recommended Practice:

SAE J163 Low Tension Wiring and Cable Terminals and Splice Clips
SAE-J198 Windshield Wiper Systems - Trucks, Buses, and Multipurpose Vehicles
SAE-J318 Air Brake Gladhands Service (Control) and Emergency (Supply) Connector for Truck-Tractor and Trailers
SAE-J336 Sound Level for Truck Cab Interior
SAE-J366 Exterior Sound Level for Heavy Trucks and Busses
SAE-J382 Windshield Defrosting Systems Performance Requirements - Trucks, Busses, and Multipurpose Vehicles

SAE-J560	Seven Conductor Electrical Connector for Truck-Trailer Jumper Cable
SAE-J598	Sealed Lighting Units
SAE-J645	Automotive Transmission Terminology
SAE-J682	Rear Wheel Splash and Stone Throw Protection
SAE-J700	Upper Coupler Kingpin-Commercial Trailers & Semitrailers
SAE-J702	Brake and Electrical Connection Locations
SAE-J706	Rating of Winches
SAE-J765	Crane Load Stability Test Code
SAE-J849	Connections and Accessories
SAE-J1063	Cantilevered Boom Crane Structures, Method of Test
SAE-J1100	Motor Vehicle Dimensions
SAE-J1292	Automobile, Truck, Truck-Trailer, Trailer and Motor Coach Wiring
SAE-J1349	Engine Power Test Code
SAE-J1436	Requirements for Engine Cooling System Filling, Deaeration, & Drawdown Tests
SAE-J1708	Serial Data Communications Between Microcomputer Systems in Heavy Duty Vehicle Applications
SAE-J1939	Recommended Practice for Serial Control and Communications Network (Class C) for Truck and Bus Applications
SAE J2014	Pneumatic Tires for Military Tactical Wheeled Vehicles
SAE-AMS-QQ-C-320	Chromium Plating (Electrodeposited)

(Application for copies may be addressed to the Society of Automotive Engineers, Inc. 400 Commonwealth Drive, Warrendale, PA 15096)

American Welding Society (AWS)

AWS C1.3-70	Resistance Welding Coated Low Carbon Steels
AWS D1.1	Structural Welding Code Steel
AWS D1.2	Structural Welding Code Aluminum
AWS D1.3	Structural Welding Code Sheet Steel
AWS D14.3	Specification for Welding Earth Moving & Construction Equipment
AWS D8.7-88R	Automotive Weld Quality Resistance Spot Weld

(Application for copies should be addressed to the American Welding Society, 550 N.W. Lejeune Road, P.O. Box 351040, Miami, FL 33135)

American National Standards Institute (ANSI)

ANSI/ASME B30.5	Mobile and Locomotive Cranes
ANSI/ASME B30.22	Articulating Boom Cranes

(Application for copies may be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018)

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes

American Society of Testing and Materials (ASTM)

ASTM A572, ASTM D396, ASTM D975, ASTM D1655 & ASTM D3699

ASME Boiler & Pressure Vessel Code Section IX Div 1

(Application for copies may be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103)

Tire & Rim Association, Inc.

Year Book

(Application for copies should be addressed to the Tire and Rim Association, Inc., 3200 W. Market Street, Akron, OH 44313)

National Electrical Code 501-4(b)

NEC Article 347.9

2.2.2. Required Military Specifications/Standards. Compliance with the following specifications/standards is called out within this specification (latest current revision at time of proposal and or contract award, unless a specific revision is specified).

MIL-S-40626	Sign, Kit, Vehicular Class
MIL-STD-209H	Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment
MIL-STD-461E	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-464	Electromagnetic Environmental Effects, Requirements for Systems
MIL-HDBK-669	Loading Environment & Related Requirements for Platform Rigged Airdrop Material
MIL-STD-810	Environmental Test Methods
MIL-STD-814B	Requirement for Tiedown, Suspension and Extraction Provisions on Military Material for Airdrop
MIL-STD-1179	Lamp, Reflectors & Assoc. Signaling Equip.
MIL-STD-1180	Safety Standards for Military Ground Vehicles
MIL-STD-1275	Characteristics for 24 Volt D.C. Electrical Systems in Military Vehicles
MIL-STD-1366	Transportability Criteria
MIL-STD-1472	Human Engineering Design Criteria Military Systems Equipment and Facilities
MIL-STD-1474	Noise Limits
MIL-HDBK-1791	Designing for Internal Aerial Delivery in Fixed Wing Aircraft
MIL-STD-2169B (S)	High Altitude Electro Magnetic Pulse (HAEMP)

Copies of listed military standards, specifications and associated documents listed in the DODISS should be obtained from the DOD Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.3. Required Military Performance Specifications. Compliance with following performance specifications is called out within this specification.

MIL-PRF-2104	Lubricant Oil, Internal Combustion Engine
MIL-PRF-2105	Lubricant Oil, Gear Multipurpose
MIL-DTL-5624T	Turbine Fuel, Aviation, Grades JP4 and JP5
MIL-PRF-32002	Cover Material, Vehicle, Coated Tactical & Combat, Heavy-Duty, Waterproof
MIL-PRF-62048	Air Cleaners, Automotive, Heavy Duty, Dry Type (for internal combustion engines)
MIL-PRF-62419	Composite Material for Military Vehicles
MIL-PRF-62550	Heater Assembly, Combustion, Vehicular Compartment, 8.8/17.6 KW (30,000/60,000 BTU/hr)
MIS-PRF-35480	Performance Specification for the Multiple Launch Rocket System (MLRS) High Mobility Artillery Rocket System (HIMARS)
MIS-PRF-35482	Performance Specification for the Multiple Launch Rocket System (MLRS) High Mobility Artillery Rocket System (HIMARS) Man Rated Crew Cab
MIS-PRF-35495	Performance Specification for the High Mobility Artillery Rocket System (HIMARS) Launcher Alternator

Copies of listed military standards, specifications and associated documents listed in the DODISS should be obtained from the DOD Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.4. Other Government Documents. Compliance with the following documents is called out within this specification (latest current revision unless specific revision specified).

7070301	Chart, Electrical, Circuit Numbers
7551383	Towbar
7722333	Grommet, Electrical Connector
7723309	Nut, Grommet Retaining, Size 28
7731428	Cover Assembly, Receptacle
8710630	Pintle Assembly
11508999	MLRS Family of Missiles Hoist Assembly Adapter
12342303	Receptacle Assembly, Vehicle, NATO Inter-vehicular Power
12342306	Cap Assembly
12378411	Equipment, Vehicle On-Board
12378420	List, Basic Issue Items
12412277	Stencil/Instruction Plate, Installation (MTV Wrecker)
12414349	Motor, Windshield Wiper, Electrical
12414615	Air Cleaner, Intake
12420325	Treatment & Finish Requirements FMTV
12420690	Nameplate Installation, Air Transport
12420852	Alternator, 100 Amp, Dual Voltage
12421527	Ground Cable Assy
12422122	Stencil Installation
12422123	Nameplate Installation
D5-15-5490	Chemical Alarm Mounting Bracket
D5-15-8779	Interface for M8 Alarm
MS52149-2	Battery, Storage - Lead/Acid (Low Maintenance)

MS75021	Connector, Receptacle Electrical - 12 Contact, intervehicular 28v, waterproof
MS90558	Connector, Receptacle, Electrical Wall Mounting
SC-D-883963 GRP9-3	Power Cable
SC-D-883964 GRP-1	Cable Stub
13219E0477	Y Fitting, Coupler-Adapter

QPL-10924	Grease, Automotive and Artillery
QPL-23827	Grease, Aircraft and Instrument, Gear and Actuator
QPL-46167	Engine Oil, Arctic

Copies of listed military standards, specifications and associated documents listed in the DODISS should be obtained from the DOD Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Copies of all other listed documents should be obtained from the contracting activity at TACOM or as directed by the Contracting Officer.

2.2.5. FMTV A1 TDP

MODEL	NOMENCLATURE	TOP DRAWING
M1078 A1	TRK, CARGO, LMTV	87T0058
M1078 A1	TRK, CARGO, LMTV, W/EQPT, W/WINCH	87T0047
M1079 A1	TRK, VAN, LMTV, W/EQPT	87T0060
M1079 A1	TRK, VAN, LMTV, W/EQPT, W/WINCH	87T0049
M1080 A1	TRK, CHASSIS, LMTV, W/EQPT	87T0057
M1081 A1	TRK, CARGO, AIR DROP, LMTV, W/EQPT	87T0059
M1081 A1	TRK, CARGO, AIR DROP, LMTV, W/WINCH	87T0048
M1082	TRAILER, CARGO, LMTV	8750339
M1083 A1	TRK, CARGO, MTV, W/EQPT	87T0063
M1083 A1	TRK, CARGO, MTV, W/WINCH	87T0051
M1084 A1	TRK, CARGO, MTV, W/MHE, W/EQPT	87T0065
M1085 A1	TRK, CARGO, LWB, MTV, W/EQPT	87T0071
M1085 A1	TRK, CARGO, LWB, MTV, W/WINCH	87T0056
M1086 A1	TRK, CARGO, LWB, MTV, W/MHE, W/EQPT	87T0072
M1087 A1	TRK, EXPANSIBLE VAN, MTV, W/O WINCH	87T0046
M1087 A1	TRK, EXPANSIBLE VAN, MTV, W/WINCH	87T0075
M1088 A1	TRK, TRACTOR, MTV, W/EQPT	87T0066
M1088 A1	TRK, TRACTOR, MTV, W/WINCH	87T0053
M1089 A1	TRK, WRECKER, MTV, W/WINCH, W/EQPT	87T0067
M1090 A1	TRK, DUMP, MTV, W/EQPT	87T0068

M1090 A1	TRK, DUMP, MTV, W/WINCH	87T0054
M1092 A1	TRK, CHASSIS, MTV	87T0062
M1093 A1	TRK, CARGO, AIR DROP, MTV, W/EQPT	87T0064
M1093 A1	TRK, CARGO, AIR DROP, MTV, W/WINCH	87T0052
M1094 A1	TRK, DUMP, AIR DROP, MTV, W/EQPT	87T0069
M1094 A1	TRK, DUMP, AIR DROP, MTV, W/WINCH	87T0055
M1095	TRAILER, CARGO, MTV	8750340
M1096 A1	TRK, CHASSIS, LWB, MTV	87T0070
A1 Family of Vehicles (FOV) KIT LIST		12422040

Army Publications:

MTMCTEA Pamphlet 55-19

MTMCTEA Pamphlet 70-1
AAR section number 6
MIL-HDBK-759

UDLP/TACOM Ground Combat Welding Code

Copies of listed military standards, specifications and associated documents listed in the DODISS should be obtained from the DOD Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Copies of all other listed documents should be obtained from the contracting activity at TACOM or as directed by the Contracting Officer.

Army Test Procedures:

TOP 2-2-508	Auto Safety & Health Hazard Evaluation
TOP 2-2-602	Acceleration; Maximum And Minimum Speeds
TOP 2-2-607	Cooling System (Automotive)
TOP 2-2-608	Braking, Wheeled Vehicle
TOP 2-2-609	Steering
TOP 2-2-610	Gradeability And Side-Slope Performance
TOP 2-2-611	Standard Obstacles (Dated 25 Jun 80)

3. REQUIREMENTS.

3.1. System Definition. The basic chassis and models of the FMTV hereinafter referred to as the vehicle shall be comprised of components, parts and accessories which meet or exceed the requirements of this specification and shall consist of chassis capable of accepting various body configurations to accommodate vehicle missions. All vehicles shall meet all requirements in all sections of this ATPD (unless otherwise indicated) in addition to the specific requirements in the respective annex for each model:

MTV

Truck, Cargo	Annex A	Truck, Tractor	Annex D	Trailer, Cargo	Annex J
Truck, Dump	Annex B	Truck, Wrecker	Annex E	Load Handling System (LHS)	Annex S

	Truck, Van	Annex C	Truck, Chassis	Annex F	LHS Companion Trailer	Annex T
LMTV						
	Truck, Cargo	Annex G	Truck Chassis	Annex I		
	Truck, Van	Annex H	Trailer, Cargo	Annex J		
OTHER						
	Central Tire Inflation System (CTIS)	Annex K	Kits	Annex M		
	Chemical Equipment	Annex L	BII	Annex N		

3.2. Vehicle Characteristics.

3.2.1. Performance Characteristics. Performance requirements shall be achieved with all models, with and without winch, at gross vehicle weight (GVW), to include all kits unless otherwise specified, but without towed load, unless curb weight or gross combination weight (GCW) is specified. All parasitic losses are to be used in performance calculations, i.e., fan, alternator losses, etc. Test criteria cited in section 4 of this specification are to be considered minimum standards.

3.2.1.1. Grade Operation. In both forward or reverse gear the vehicle shall be capable of climbing and descending a 60% longitudinal slope at GVW (VCW for LHS), 30% at GCW, (22% at GCW for wrecker and LWB Cargo's M1085 & M1086, 27% grade test at GCW for tractor/ M871 semitrailer combination) with intermediate starts and stops on a dry hard concrete surface free from loose material. There shall be no evidence of stalling, slipping, overheating, upsetting, hesitation, leaking of fuels, lubricants or coolants, no loss of mobility or stability, and no loss of fuel or oil pressure or flow to the engine while performing these operations. Engine must start headed up and down slope.

3.2.1.2. Side Slope Operation. The vehicle shall be capable of starting and stopping the engine while on, and traversing, side slopes of up to 30% (20% for LHS) on a dry, hard concrete surface, free from loose material. There shall be no evidence of stalling, slipping, overheating, upsetting, hesitation, leaking of fuels, lubricants or coolants, no loss of mobility or stability, and no loss of fuel or oil pressure or flow to the engine while performing these operations.

3.2.1.3. Steering and Handling. Power steering shall be furnished with capability at rated GVW to turn steered wheels to their limits on a stationary vehicle without leakage of power steering fluid. A mechanical connection between steering wheel and axle steering mechanisms shall exist under all conditions.

3.2.1.4. Speed. The vehicles shall be capable of maintaining the following speeds on primary roads:

VARIANT	WEIGHT	SPEED (mph) on 2% Slope	SPEED (mph) on 3% Slope
TRACTOR/WRECKER/LHS/ Expansible Van	GCW	35	25
ALL *	GVW	55	45

ALL OTHERS *Except CHASSIS, LHS, Expansible Van	GCW	40	30

The vehicle shall be governed so as not to exceed a speed of 65 mph on level roads.

3.2.1.5. Turning. The Wall to Wall turning radius for the LMTV shall not exceed 35 feet (11 m) in one continuous movement. The Wall to Wall turning radius for the M1083 A1 shall not exceed 40 feet (12 m). Vehicle with stated towed items shall be capable of turning, in one continuous movement, two standard NATO 24 x 24 feet (7.3 x 7.3 m) roads intersecting at 90°.

3.2.1.6. Vertical Step. The vehicle (except MTV and LMTV trailers) shall, at GVW, be capable of negotiating a 24 inch (61 cm) minimum vertical step in both forward and reverse directions in a CTIS setting of cross country.

3.2.1.7. Fording. The vehicle shall be capable of operating in fresh and salt water in depths to 30 inch (76 cm) without preparation. Fording for 15 minutes shall not cause engine stall, damage or degradation of vehicle components, need for maintenance actions nor render the vehicle incapable of performing any operation of this specification. Excepted from this requirement are any non-sealed brake components. While fording, the engine shall be capable of being restarted when stopped for 10 minutes. Seals shall restrict the entrance of foreign matter into bearings which are exposed to contamination during these operations. Water contamination of bearing lubricants shall not be more than 2.0% by volume. All bearing seals shall restrict the leaking of lubricants from the bearings. Water contamination of engine, brake fluid, transmission, transfer transmission, power steering pump, fuel tank(s) and all differentials shall not exceed 2.0% by volume. Vented components shall be vented above the 30-inch fording line without kit.

3.2.1.8. Range. The vehicle shall be capable at GCW (wrecker at GVW) of being operated for at least 300 miles (483 km) on highway from integral fuel capacity at an average convoy speed of not less than 25 mph (40 km/h).

3.2.1.9. Noise. The exterior noise shall not be greater than 83 dB (A) at a distance of 15 meters from the centerline of the vehicle path when measured according to the procedure cited in paragraph 4.7.8. Interior steady-state noise at each crew position (driver and passengers) in the cab shall be less than 85 dB (A) when PTO driven equipment, not normally utilized during vehicle movement, is not in use.

3.2.1.10. Emissions (Reference 1.2.a). The vehicle shall comply with Environmental Protection Agency (EPA) emission regulation/standards for new motor vehicles and new motor vehicle engines in effect at the time of sale of the vehicle, except as allowed by EPA exemptions.

3.2.1.11. Braking. All vehicles (trucks and trailers) shall be equipped with an Anti-lock Brake System (ABS) and shall comply with FMVSS 121. Brake linings shall be constructed from non-asbestos materials. The brake system shall be comprised of components that will not require maintenance due to corrosion, during durability testing per Section 4. The power source for the ABS on the FMTV Trailers shall be full time through a separate circuit on the FMTV Truck with the backup power through the stop lamp circuit. Trailer brake system shall operate when towed by non-ABS equipped trucks. In the event of an ABS failure, vehicle shall be able to continue the mission using the standard air-brake system for service brakes. ABS indicator lights on the trailer as per FMVSS 121 will not be required due to the vehicle tactical requirements.

3.2.1.11.1. Service Brakes. The service brakes shall control and hold the vehicle on a dry hard surface 60% grade, when headed up or down slope. On a dry hard level road that is free from loose material, application of the service brakes shall bring the vehicle (at GVW) to a complete stop from a speed of 20 mph (32 km/h) within 32 feet (9.75 m), measured from the point of brake application. Brake pedal force to achieve above performance shall be

within that possible by the full range of drivers. Application of service brakes shall cause activation of brake lights to include override of emergency flashers unless emergency flashers consist of separate lights. At GVW and GCW the vehicle shall pass the Jennerstown Brake tests (IAW TOP 2-2-608); ABS shall be operational on all variants during this test.

3.2.1.11.2. Parking Brake. The parking brake shall be capable of holding the vehicle wheels from rotating where braking is applied, at GCW on a 30% grade, headed up or downgrade, on a dry hard surface free from loose material. An indicator light shall alert the crew when the parking brake is engaged. The parking brake system shall at all times be capable of being applied and released by any driver's muscular effort and immediately available for re-application. Braking energy shall not be dependent on maintenance of air or hydraulic pressure or electrical energy.

3.2.1.11.3. Emergency Brakes. The emergency brake system, in the event of a single point failure in the service brake system, shall stop the vehicle at least once on a 30% slope and, after emergency applications per FMVSS 121, shall remain engaged until intentionally disengaged by operating personnel. The only exception to this is for the tractor model when hauling an M871A1/A2 semi-trailer, in which case, it shall meet these requirements on a 27% slope. Emergency braking shall include a means of providing adequate vehicle stopping in the event of a trailer breakaway.

3.2.1.11.4. Glad Hands. Glad hands shall be provided at the rear and front of vehicle.

3.2.1.12. Survivability. Vehicle design shall incorporate consideration of vehicle and crew survivability as follows: in general, the design shall protect such vulnerable components as air, fluid, and electrical lines and components by routing or placement in areas shielded by heavier components. These and other components critical to vehicle operation shall be protected to the extent possible without serious departure from standard automotive design principles. Any components exposed up to 40 inches from the ground with the emergency CTIS setting in force, to include hoses, cables, lanyards, lines, tanks, valves, wires, cylinders, boxes, shall be shielded or able to withstand, going in forward or reverse, with no degradation of vehicle operation: the repeated impact of brush and tree branches; dry debris raised by cross country operation; soil scraping at 5 mph.

3.2.1.12.1. Electromagnetic Emission/Interference. All complete vehicle configurations including basic chassis and cab, body assemblies, kits, cranes and ancillary equipment shall continue to function when exposed to emissions from Electromagnetic Compatibility (EMC) and Near Strike Lightning (NSL). Emissions from the FMTV shall not cause Electromagnetic Interference (EMI) with mission critical equipment located within the FMTV or in the surrounding area. EMC Radiated Susceptibility (RS) requirements for external electromagnetic environments for Army ground systems are listed in Table I.c of MIL-STD-464. FMTV shall meet the requirements of MIL-STD-464, Electrostatic Charge Control section 5.7, NSL Section 5.4 and EMI Section 5.6. All vehicle and kit configurations shall not have any inherent Electrostatic Discharge (ESD) characteristics.

3.2.1.12.2. High Altitude Electromagnetic Pulse (HAEMP). All mission essential functions (6.3.19) shall meet operational requirements when fully tested to verify operation, within a maximum of 15 minutes maintenance by the crew (using only on-board tools) after exposure to a HAEMP specified in MIL-STD-2169B (S) and QSTAG-244 Edition 4.

3.2.1.12.3. Blackout Condition Lighting. Blackout condition lighting shall be provided in accordance with MIL-STD-1179. No other vehicle lighting shall be capable of being activated while in the blackout mode except where otherwise required by this ATPD.Mobility. The Material Handling Equipment (MHE) equipped cargo model at GVW plus the equivalent weight of a winch in the cargo bed and with all kits must be capable of operating over cross country terrain, primary and secondary roads and trails for the appropriate mobility level stated herein under the varied environmental conditions encountered. Other FMTV models shall perform to a level appropriate to their GVW. If the MTV cargo model with MHE requires CTIS to meet the mobility requirements of 3.2.1.13 and

3.2.1.13.1 then all FMTV models shall have CTIS. The mobility characteristics shall equal or exceed those quantified by the following NATO Reference Mobility Model (NRMM).

MINIMUM MOBILITY RATING SPEEDS (mph)
Cargo Trucks At GVW

	Germany			Mid-East		
Tactical Mobility Level	Dry	Wet	Snow	Dry	Wet	Sand
Tactical Standard	15	14	4	16	15	2

MINIMUM MOBILITY RATING SPEEDS (mph)
Cargo Trucks With Companion Trailers At GCW

	Germany			Mid-East		
Tactical Mobility Level	Dry	Wet	Snow	Dry	Wet	Sand
Tactical Standard	15	2	3	16	10	2

The FMTV shall have percent NO-GO, no greater than below:

MAXIMUM PERCENT NO-GO
Cargo Trucks at GVW

Germany			Mid-East		
Dry	Wet	Snow	Dry	Wet	Sand
9	14	29	6	6	13

MAXIMUM PERCENT NO-GO
Cargo Trucks with Companion Trailers at GCW

Germany			Mid-East		
Dry	Wet	Snow	Dry	Wet	Sand
16	38	37	9	9	24

3.2.1.13.1. Vehicle Cone Index (VCI). The M1084 A1 single pass VCI_1 (fine grained) shall have a value no greater than 25 at the tire inflation pressure for snow/mud/sand, if CTIS equipped. If not equipped with CTIS, shall permit vehicle speeds up to 40 mph for continuous operation on roads, trails, and cross-country. Other FMTV models shall perform to a level appropriate to their GVW. The single pass VCI_1 (fine grained) at GCW (MTV Cargo with MHE towing an MTV Trailer) shall be no greater than 35 at the above tire pressures. The calculated VCI_1 (fine grained) shall employ the deflection ratio effect algorithms.

3.2.1.14. Ride Quality. The vehicle shall demonstrate controllability by MOS-designated drivers. In order to protect human health, whole body vibration shall meet the requirements of MIL-STD-1472, during testing. The vehicle shall attain no more than 6 watts average vertical absorbed power at the driver's station while negotiating a 0.7 inch Root Mean Square (RMS) course at speeds up to 25 mph, a 1.0 inch RMS course at speeds up to 17 mph, and a 1.5 inch, RMS course at speeds up to 12 mph with the tires at normal cross-country inflation pressure. The vehicle shall show no more than 2.5g acceleration at the driver's station while negotiating half-round obstacles of 8 inch height at a speed of at least 12 mph, and a 10 inch height at a speed of at least 7 mph, with tires at normal cross-country inflation pressure.

3.2.1.15. Approach and Departure Angles. The approach angle of all models with and without kits and with and without winch, shall be a minimum of 40°. The departure angle of the basic cargo trucks, with and without kits and with and without winch, shall be a minimum of 40°. Approach and departure angles shall be defined in accordance with SAE J1100.

3.2.1.16. Ground Clearance. The vehicle, with and without kits, with tire pressures at highway mode, shall have a minimum ground clearance between axles of not less than 22 inches (56 cm).

3.2.1.17. Towing. The vehicle shall be capable, on a paved level road under all climatic conditions, of:

a. Towing a like vehicle (see paragraph 6.3.14) at GVW for a distance of at least 100 miles at a speed of 35 mph, without preparation, without degradation or damage to either vehicle. Vehicles shall be capable of towing another vehicle (like vehicle and all vehicles required by this specification) using a standard Army Towbar 7551383 (if needed), while turning in a wall to wall radius of no more than 40 feet (MTV) and 35 feet (LMTV) without interference.

b. Being towed at GVW by a like vehicle (see paragraph 6.3.14) for a distance of at least 100 miles at a speed of 35 mph, with all wheels on ground, without preparation, without degradation or damage to either vehicle.

c. Being lift towed at GVW for a distance of at least 100 miles at a speed of 35 mph, without preparation except that the driveshaft(s) to the wheels in contact with the ground shall be removed, without degradation or damage to either vehicle.

3.2.2. Physical Characteristics.

3.2.2.1. Dimensions. Dimensions shall be defined in accordance with SAE J1100 except for para W103 vehicle width, which is redefined as: the maximum dimension measured between the widest points on the vehicle, excluding exterior mirrors and marker lamps, but including bumpers, moldings, and sheet metal protrusions. The vehicle dimensions for worldwide operation and transportability, shall not exceed those stated in Section 6.

3.2.2.2. Vehicle Loading. Vehicle weights and loads shall be as defined and specified in Section 6. The LMTV, at GVW, shall have the ability to tow an LMTV trailer having a gross weight of 12,000 lb., with a static vertical pintle load of 1,200 lb. The MTV, at GVW, shall meet all requirements stated for LMTV, except while towing a trailer having a gross weight of 21,000 lb., with a static vertical pintle load of 2,100 lb., and separately, a M198 Howitzer, having a gross weight of 16,500 lb.

3.2.2.3. Protective Coatings and Corrosion Control.

3.2.2.3.1. Painting. All exterior and interior paint shall be IAW drawing 12420325, including the required metal preparation and primers, unless otherwise specified in this ATPD or in the TDP. Unless otherwise specified, color for the interior shall be lusterless green #383, and color for the exterior shall have the required color camouflage pattern. The appropriate procedure (Method Number IAW drawing 12420325) shall be identified, and shall match material being coated and specific application needs (for example, Method 6 is required for surfaces which exceed 400° F during normal operations). For the vehicle areas identified in the technical data package accompanying this solicitation, A-A-52474, GM9984070 or GM9984017 E-coat primer shall be used.

3.2.2.3.1.1. Paint Control. The following vehicle components shall not be painted or over-treated: 1) the working components of the ISO locking hardware; 2) vents for gear boxes/hydraulic reservoirs/fluid containers; 3) winch components that would inhibit proper operation; 4) glad-hand or any other color coded assemblies; 5) quick release pins for assemblies; 6) dust caps for air brake chambers; 7) outer front axle rubber hub doors; 8) door moldings; 9) tires; 10) glass or lenses; 11) gauges or indicators and; 12) material whose performance or normal useful service life would be degraded by the application of the paint. There shall be no over spray on informational components such as instruction plates. All internal and external thread shall be greaseless and free from paint before painting. Painted surfaces shall have a smooth, continuous, adherent film that is free of unusual surface imperfections affecting performance or appearance, such as: incomplete coverage, runs, sags, or blisters.

3.2.2.3.2. Protective Coatings. Chip resistant coatings and all application areas shall be approved by the Government and shall protect areas subjected to road debris impacts, (i.e., exterior of engine oil pan, wheel wells, radiator bottom tank). Rust preventative compounds and application areas shall be approved by the Government and

shall protect critical areas, (i.e. interior surfaces of structural tubing, boxed-in areas, and all faying surfaces), on vehicles to be shipped directly outside continental United States.

3.2.2.3.3. Corrosion Control Performance. The vehicle shall meet the requirements of the baseline 22-year corrosion prevention design of the baseline level III technical data package. The corrosion prevention design of the vehicles/trailers shall address vehicle frame, vehicle sub-framing, vehicle cab and support framing, cargo bed and support framing, vehicle functional sub-systems, component and part levels, functional mechanisms and vehicle paint systems, and shall function through a minimum of 22 years service life (which can include extended periods in corrosive environments involving one or more of the following: high humidity, salt spray, road de-icing agents, atmospheric contamination, temperature extremes and gravel impingement), without loss to form, fit or function caused by corrosion damage and shall not exhibit corrosion products, internally or externally of red, black and/or white deposits greater than stage 2 (as defined in TM 3080.34). Only normal washing, scheduled maintenance and repair of user induced damage (not a result of deficiency in design, material, or manufacturing) shall be necessary to keep the corrosion prevention design in effect.

3.2.2.3.4. Vehicle Corrosion Evaluation. The vehicle shall be tested and evaluated IAW section 4.7.21.

3.2.2.3.5. Dissimilar Metals. Dissimilar metals shall be electrically isolated to prevent galvanic corrosion.

3.2.2.3.6. Non-Skid Surfaces. Surfaces of a vehicle to be used as walkways, working areas, or steps shall be provided with non-skid protection.

3.2.3. Reliability. Each model shall have a reliability no lower than shown in Table I.

3.2.3.1. RESERVED.

3.2.3.2. RESERVED.

3.2.3.3. The LMTV Material Handling Equipment (MHE) shall demonstrate a Reliability of 400 Mean Cycles Between Hardware Mission Failures (MCBHMF) at a point estimate.

3.2.3.4. The MTV Material Handling Equipment (MHE) shall demonstrate a Reliability of 1,800 Mean Cycles Between Hardware Mission Failures (MCBHMF) at a point estimate.

3.2.4. Maintainability. Each model shall have a maintenance ratio (MR) no greater than specified in Table I.

TABLE I

		MAINTENANCE RATIO		
MODEL	MMBHMF	UNIT	IDS	IGS
M1078A1, M1080 A1, M1081 A1	10,000	0.004	0.0008	0.0002
M1079 A1	6,600	0.0044	0.0009	0.0002
M1082	12,000	0.0014	0.0002	0.0
M1083 A1, M1084 A1, M1085 A1, M1086 A1, M1092 A1, M1093 A1, M1096 A1	10,000	0.006	0.0014	0.0002
M1090 A1, M1094 A1	3,000	0.0068	0.0022	0.0002
M1087 A1	6,600	0.007	0.0022	0.0002
M1088 A1	3,800	0.0055	0.001	0.0002
M1089 A1	2,800	0.0064	0.0016	0.0002
M1095	12,000	0.001	0.0002	0.0

LMTV Crane (MHE) MTV Crane (MHE) HIMARS RSV Crane (MHE)	400 * 1,800* 5,500** 3,055***	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A
LHS Truck	4,500	0.0064	0.0016	0.0002
LHS Trailer	10,000	0.001	0.0002	0.0

MMBHMF - Mean Miles Between Hardware Mission Failure
MCBHMF - Mean Cycles Between Hardware Mission Failure
**MCBSA - Mean Cycles Between System Abort
***MCBEFF - Mean Cycles Between Essential Function Failure
MR - Maintenance Man-Hours Per Operating Mile
MHE - Material Handling Equipment
IDS - Intermediate Direct Support
IGS - Intermediate General Support

3.2.5. Engine and Power Train Durability. Each FMTV model shall have a 0.6 probability with a 50% confidence of completing 20,000 mi. (32180 km) per the mission profile without a durability failure.

3.2.5.1. Engine Accessibility. The FMTV shall have a 0.90 probability of removing and reinstalling a replacement engine, transmission, or engine and transmission assembly, in less than 12 clock hours by no more than 2 individuals plus one crane/wrecker operator for all body styles utilizing existing Army maintenance equipment. There shall be easy accessibility to the engine for normal checks and services. The engine configuration described in this section is for a "dressed engine" as defined in Section 6.

3.2.5.2. Oil Sampling. Oil sampling valves (see MIL-V-81940 for guidance) shall be provided in a readily accessible location for the engine, transmission, and hydraulic system. The oil sampling valves shall be located ahead of the oil filters, and shall be usable while the engine is running. The valves shall be located in such a way as to insure that personnel shall not be exposed to danger when taking oil samples with the engine running. Each sampling valve location shall be labeled to identify the source of the sample.

3.2.6. Chemical Agents Equipment. Dedicated space shall be provided for stowage of troop-installed equipment used for detection, protection and decontamination IAW Annex L. All selected locations for equipment storage, shall be readily accessible to the crew. When located externally, the equipment shall be protected from normal operational hazards. All spaces shall be marked with suitable abbreviations describing the equipment to be stowed in the respective spaces.

3.2.7. Environmental Condition. The vehicle and its systems shall be capable of starting and operating in the ambient temperature range of 120° F to -25° F without the use of an arctic kit, and to -50° F with an arctic kit. Temperatures shall be recorded 6 feet (1.8 m) above the ground.

3.2.8. Transportability. The vehicle shall be transportable by highway, rail, marine, and air modes worldwide, without special permits. The applicable transportability criteria are set forth in MIL-STD-1366; additional transportability guidance can be found in MIL-HDBK-1791. The vehicle curb and gross weight shall include the crew for highway transport as a self-propelled vehicle.

3.2.8.1. Medium Lift Helicopter. The LMTV cargo at rated GVW less crew with payload reduced as necessary and the MTV standard cargo without MHE at curb weight less kits and less crew shall be transportable

externally by the Chinook CH-47D helicopter in an environment of 70° F ambient at 2,000 feet for 30 nautical miles at speeds not to exceed 100 knots in accordance with MTMCTEA Pamphlet 70-1. The MTV (except wrecker and van) shall be externally transportable by the CH-53E helicopter, with a payload commensurate with the maximum helicopter slingload, in the following environment: 60° F, sea level, for 30 nautical miles at speeds not to exceed 100 knots. The vehicle shall meet the requirements of MIL-STD-209H, type II for helicopter transport.

3.2.8.2. Cargo Aircraft. The vehicle at GVW less crew shall be capable of being transported on C-130 and C-141 aircraft. All vehicles except vans and wrecker shall have a maximum preparation time for air transport of 15 minutes using only onboard equipment. The expansible van and LMTV van shall have a maximum of 60 minutes of preparation. The wrecker shall meet these requirements within 120 minutes. Times stated are with two people (vehicle operators). All equipment removed in order to meet air transportability (except tractor, wrecker, expansible van and LMTV van bodies) shall be stowed on the vehicle. The vehicle shall meet the requirements of MIL-HDBK-1791 with the exception of the cargo clearance distance from the ceiling changing from 6 inches to 2.5 inches resulting in a maximum cargo height from 102 inches to 105.5 inches.

3.2.8.3. Airdrop. The Air Drop (AD) vehicle models, i.e. LMTV Cargo (M1081A1), MTV Cargo (M1093A1), MTV Dump (M1094A1), LMTV Cargo Trailer (M1082), and MTV Cargo Trailer (M1095), at maximum allowable rigged weight less crew shall be air-droppable while meeting the requirements of MIL-STD-814B. Further transportability guidance can be found in MIL-HDBK-669 and MIL-HDBK-1791. The maximum height of the vehicle shall not exceed 90 in. (228 cm) for AD models. Vehicles will be adaptable to the airdrop mode in 30 minutes utilizing hand tools. Vehicles shall meet tip off curve requirements of C-130 and C-141 aircraft as defined in MIL-HDBK-1791. The Aft Emergency Restraint requirements of MIL-STD-814B, paragraphs 5.6 and 5.7.5, are not applicable to this procurement. Trailer models shall require no hardware modifications to prepare them for air drop.

3.2.8.4. Rail. All vehicle variants (except Van body) shall be designed to meet the dimensional requirements of the NATO Envelope B when loaded on 50 in (127 cm) high European flatcars. The vehicle at both GVW and GCW (GVW only for tractor and wrecker) less crew weight shall withstand without damage or degradation a military standard rail impact test (paragraph 4.7.31.5) with heaviest pintle-towed load attached. Preparation time shall be the same as for transport in Cargo Aircraft (paragraph 3.2.8.2).

3.2.8.5. Lifting and Tiedown Provisions. The lifting and tiedown provisions, including the connecting structural members on the vehicle, at gross rigged weight for airdrop less crew and at GVW, less crew shall be in accordance with MIL-STD-209H. Complete diagrams and instructions for lifting and tying down the vehicles for the various transport modes shall be provided. Instructions shall be included for component removal and subsequent storage when required for transport. Stencil or decal markings IAW drawing 12422122 shall be applied to the vehicle at each lifting and tiedown point. The tiedown procedure shall permit tiedown of the vehicles to the floor (or deck) of the transport medium in such a manner as to prevent shifting or movement in any direction. The vehicle tiedown provisions for railcar tiedown shall consist of four and only four provisions and shall meet the requirements of MIL-STD-209H with a tiedown procedure consisting of one and only one tiedown device per each tiedown provision per MTMCTEA PAMPHLET 55-19 and AAR Section 6. Dimension D in Figure 5 of MIL-STD-209H shall be large enough to accommodate the passage of the necessary number of tiedown devices through the tiedown provision.

3.2.9. Cab. The FMTV cab shall have seating provisions for 3 crew members when radios/radio mounts are not installed, 2 crew members when installed. Doors shall comply with FMVSS 206.

3.2.9.1. Water Resistance. When assembled, cab and all components shall be waterproof to preclude the entrance of water due to rain, melting snow, road splash and the penetration of moisture from all other causes. Vapor material shall be applied to prevent the possible accumulation of condensation on the interior of the cab. Seams shall be coated with a sealer to provide a waterproof joint.

3.2.9.2. Vibration Requirements. The cab structure assembly shall pass a 200 hour Government approved hydropulse test to include the following installations at a minimum: entire cab structure, door locks and fittings, steering column and wheel, instrument panel array including heater and circuit breakers, wipers, washer, mirrors, all 3 seats with appropriate weights, machine gun ring and simulated gun mass, floor covering, drain plugs, headlights, harnesses as needed to connect everything electrical, accelerator pedal, pneumatic controls, chemical alarm and standard communications equipment, and fixed glass and seals. It shall also mount on a simulated frame including the FMTV front and rear cab mounts. No more than 5% of any of these shall fail the test: cab structure joining mechanisms (linear weld, spot welds, bonds of any kind), installed mechanisms or devices.

3.3. Design and Construction.

3.3.1. Material. Radioactive materials shall not be used. All materials shall be new and unused. Materials not specified shall be selected by the supplier to conform to standards applicable to off-road/construction vehicles. Such selected material shall be galvanically compatible with, or insulated from, mating surfaces.

3.3.1.1. Component Ratings and Specifications. All system components shall be rated and approved by the component manufacturer for vehicle application. Existing ratings and specifications shall not be raised nor changed with the intention to meet the requirements of this specification.

3.3.1.2. Flammability of Interior Material. The interior material shall conform to the flammability requirements of FMVSS 302.

3.3.1.3. Material Durability. Nonmetal components shall not deteriorate due to mold, fungus, moisture, repeated exposure to bright sunlight, or use while stored in accordance with TM 9-2320-391-20, Section IV, Chapter 2-21.

3.3.2. Nameplates or Product Marking. Vehicle exterior marking shall be IAW drawing 12422123 for nameplates (12420690 for air transport), 12422122 for stencils, as denoted in the TDP for body peculiar stencils or nameplates (example, 12412277 for wreckers). Markings shall be lusterless black color #37030 or in other camouflage pattern colors if placement of markings in a black area of the pattern is necessary. Instruction, caution, identification, operating and data plates shall be provided IAW A-A-50271 and attached by screws bolts, or rivets. Military model number, nomenclature, National Stock Number (NSN), contract number, date of manufacture, manufacturer's serial number and US Army Registration number shall be embedded or embossed on an additional metal identification plate (see MIL-HDBK-1223 for guidance) and installed in the vehicle crew area in a readily visible location. The chassis shall be equipped with instructions, plates or diagrams including procedures to be followed in operating, servicing, and, if necessary, assembling the chassis. Decals may be used where attachment by screws, bolts or rivets is impractical due to the shape of the object or its location; the attachment method could result in damage to the component; or a rigid plate could be a hazard to personnel. Decal material should be IAW with MIL-M-43719, General Specifications for Marking Materials and Markers, Adhesive, Elastomeric, Pigmented, or its commercial equivalent.

3.3.2.1. Vehicle Weight Classification Sign Kit. The contractor shall apply the vehicle weight classification numbers to each vehicle utilizing a vehicle classification number kit conforming to MIL-S-40626, except that the colors used shall be black characters on a background field of green #383. The kit shall be located on the front of the vehicle in a location as denoted in the TDP. The contracting officer shall assign the classification numbers to be displayed on the vehicle. Instructions for changing the number based on the vehicle configuration shall be provided in the operator's manual.

3.3.3. Workmanship. Workmanship shall be of the highest grade consistent with the intention of this specification. Each vehicle shall have no evidence of cracks, dents, scratches, burrs, sharp edges, loose parts, foreign matter, or any other evidence of poor workmanship that shall render the vehicle unsuitable/unsafe for the

purpose intended. The cab, chassis and bodies shall be designed such that normal vehicle operation does not cause chafing, binding or other damage to any harness, hose, control cable, lanyard, tube or line.

3.3.3.1. Weld Procedure Qualification. Welding procedures shall be developed IAW American Welding Society (AWS) IAW AWS C1.3-70, AWS D1.1, AWS D1.2, AWS D1.3, AWS D14.3, or AWS D8.7-88R or similar commercial weld codes and submitted for Government approval. The use of pre-qualified weld joints as specified in AWS D1.1 does not preclude submittal of welding procedures. Repair welding of defective parts shall require Government approval and a written procedure identifying proper technique and approach to correct defective product.

3.3.4. Safety. Exposed components and systems which are subject to high temperatures, high pressures, electrically actuated, or inherently hazardous, shall be provided with correct safeguarding and insulating features. Vehicle shall comply with all applicable requirements in MIL-STD-1180 for Type I vehicles. Type II seat belts, conforming to FMVSS 209 and 210, shall be provided at all 3 crew seating positions.

3.3.5. Human Engineering. The vehicle shall be operable and maintainable in accordance with MIL-STD-1472 by personnel in the following Military Operational Specialties (with special emphasis on restrictive NBC or arctic protective garments under MOPP IV conditions):

88M	Motor Transport Operator
77F	Petroleum Supply Specialist
29E	Communications-Electronic Radio Repairer
31L	Tactical Communications System Mechanic
35E	Special Electronic Devices Repairer
35H	Calibration Specialist
44B	Metal Worker
63B	Light Wheel Vehicle Mechanic
63G	Fuel and Electrical System Repairer
63J	Quartermaster and Chemical Equipment Repairer
63W	Wheel Vehicle Repairer

3.3.5.1. Human Factors. Foot and hand holds that would be convenient for the 5th percentile female through 95th percentile male soldier (with combat equipment and in either arctic gear or MOPP-4) to climb into the cab, cargo bed, and mission equipment (FMTV variants) form a hard, level, dry surface. These foot and hand holds shall be able to adequately support the 95th percentile infantry soldier with full equipment in either arctic gear or MOPP-4 (up to 300 lbs.) load without causing damage to the vehicle or components. All hand holds and steps necessary for the operator and maintenance personnel to gain access to various locations on the vehicle shall be integral to the vehicle.

3.4. Chassis Components.

3.4.1. Engine. The engines shall be fuel efficient and operate under all conditions specified. The fan clutch shall be such that, in the event of failure, the fan shall be constantly engaged. The oil filler tube shall allow the addition of oil from a standard 1 quart can without the use of a funnel. An engine governor shall be furnished, set and sealed to limit the engine to the manufacturer's maximum recommended operating RPM. There shall be at least two independent controls capable of returning the throttle to idle position, in accordance with FMVSS 124. Engines shall incorporate an exhaust brake and have the ability to operate on alternate fuels specified in paragraph 3.4.1.9.

3.4.1.1. Test Equipment. Built in Test Equipment (BITE) is required for common modes of failure which shall be identified on a within-the-cab display providing for rapid operator/ maintainer actions. Data bus communications for electronic controlled drivetrain components shall be in accordance with SAE J1939, diagnostics shall be in accordance with SAE J1708 and easily upgradeable by software once J1939 diagnostic protocol has been

approved by industry (SAE committee). There shall be no DCA connector. Information diagnostics as available from drive-train ECU's/ECM's or SAE J1708 data bus shall be accessible at the on board diagnostic connector. The connector for the diagnostic shall be a J1939 Deutsch 9 pin female connector that handles both J1708 and J1939 protocols. The connector shall include a cap that keeps the connector dry from water and moisture.

3.4.1.2. Heavy - Duty Cooling System. A heavy duty cooling system shall be furnished. The cooling system shall be capable of retention and recovery of 6% coolant overflow or have 6% expansion reserve capacity. The cooling system shall be capable of continuous de-aeration of 0.1 cfm of air per cylinder at rated engine speed at any slope the vehicle is required to operate on. The system shall fill completely, with an automatic de-aeration feature to preclude air cavitation at any coolant fill rate up to the maximum fill rate. The cooling system shall meet the following requirements:

a. Maintain the specified component operating temperatures within the specified limits while operating continuously at full load and 0.6 tractive effort to gross vehicle weight ratio (TE/GVW) while under the maximum conditions of 120° F for all models with the exception of the LHS, Tractor and Wrecker which shall meet a minimum of 0.55 TE/GVW while under maximum conditions of 120° F.

b. Does not exceed temperature limits while operating at rated engine power.

c. Meets the requirements after a drawdown of 10% of engine coolant. Specified fluid temperatures shall not exceed the lower of those for which the component manufacturer shall provide warranty, or the following:

Component/Location	Full Load
Engine Oil Sump	275° F
Transmission, Transfer Case, Differential	300° F
Radiator Top Tank, Coolant	230° F
Engine Oil Gallery and Transmission Sump	Maximum temperatures for which application vendors will provide application approval

d. The radiator shall have a maximum of 4 fins per cm and shall be located to minimize air side fouling. Heavy-duty clamps shall be used, shall be clearly visible, located for ease of connection, and ensure positive sealing. The cooling system shall not be comprised of heat exchangers in series in areas prone to fouling.

3.4.1.3. Engine Coolant. If water-cooled, the engine shall be serviced with a solution of ethylene glycol conforming to CID A-A-52624, Type I, and water in equal parts by volume.

3.4.1.4. Engine Air Induction System. The air induction system as installed shall prevent entrance of foreign matter during vehicle operation. The air inlet shall be located to ensure that no water entry during splash and fording shall occur. The air inlet shall be located in a low dust area of the dust plume to extend element life. Pre-shaped tubing shall be used in the air induction system. An in-cab, resettable, and graduated air filter restriction gauge shall be furnished.

3.4.1.5. Air Cleaner. The vehicle shall incorporate an inertial type air cleaner system that complies with the requirements of drawing 12414615 and MIL-PRF-62048, Air Cleaners, Automotive, Heavy Duty and Dry Type; except that the 200 hour durability test shall be met at the rated air flow which is defined as the air flow of the engine at published engine speed.

3.4.1.6. Oil Filter. A full flow type oil filter system with integral emergency bypass, IAW the engine manufacturer's specification, shall be furnished to ensure maximum engine protection.

3.4.1.7. Fuel System. The fuel system shall meet the requirements of FMCSR, para 393 subpart E, and incorporate the Standard Army Refueling System (SARS) components. The fuel delivery system shall include an automatic water separator. A fuel preheater shall be provided to ensure satisfactory operation in cold climates specified in para 3.2.7.

3.4.1.8. Fuel Tank(s). Vehicle shall be equipped with corrosion resistant fuel tank(s) (i.e. composites with mechanical properties equal to existing fuel tanks or metal tanks with internal rust inhibitors). The dashboard fuel level gage shall operate within a 2.5% error rate. Metal fuel lines shall be galvanically insulated from adjacent surfaces. Mounting straps used to secure metal tanks to frame/chassis shall also be insulated. The fuel tank/line venting system shall not be combined or inter-connected with any other vent system. When more than one tank is furnished, fuel level shall equalize in both tanks. A shut-off valve between the 2 tanks shall be furnished. Fuel tank(s) shall be provided with drain plug(s) and safety type tank filler caps, captive chained to filler neck strainers, which are accessible and removable by personnel wearing arctic mittens. The vehicle shall be able to operate under all conditions specified herein with 10 % of the usable fuel remaining. Fuel tank ports must be a minimum of 2.25 inches (5.7 cm) inside diameter, and shall be compatible with NATO dispensing nozzles having a nominal outside diameter of 2 inches (51 mm).

3.4.1.9. Fuels and Lubricants. Vehicles shall be operable with applicable standard military fuel and lubricants without adverse effect on vehicle components and vehicle performance. The vehicle lubricants shall conform to the requirements of MIL-PRF-2104, MIL-PRF-2105, QPL-46167, QPL-10924, and QPL-23827. The vehicle's military fuels shall conform to the required fuels specified below.

Primary	Alternate	Emergency
A-A-52557 ASTM D1655 (JP8), F34	ASTM D1655 (DF1, DF2 & DFA) F54	ASTM D396 (Fuel Oil, No. 1 & 2 Reference No. I & II)
	MIL-DTL-5624T (JP5), F44	ASTM D975 (Fuel, MIL-DTL-5624T (JP-4)), F40
	ASTM D975 (Fuel Naval ASTM D3699 (Kerosene)) F45 Distillate, F76	

3.4.1.9.1. Fuels. The vehicle/engine shall be capable of operating in all environmental conditions, para 3.2.7, on primary and alternate fuels (3.4.1.9.1.1 and 3.4.1.9).

3.4.1.9.1.1. Alternate Fuels. The vehicles shall be capable of continuous operation with MIL-DTL-5624T, grade JP5 (in all ambient temperatures) and ASTM D1655, DF1, DF2 & DFA (in all ambient temperatures) without adverse impact on reliability, durability or warranty.

3.4.1.9.2. Lubricating Oils and Greases. The lubrication intervals shall be as required by the component manufacturers. A lubrication chart shall be furnished with each vehicle and shall include interchangeable military lubricants as well as commercial lubricant designations. Lithium based grease shall be used in corrosion prone areas where grease lubrication is required.

3.4.1.9.3. Hydraulic System. If equipped with a PTO for winch or other driven equipment, the vehicle shall have a hydraulic tank and filter system. The tank must be flushable without removal from the chassis. Unused ports shall have metal plugs installed. The tank shall include internal filtration. The return line shall exhaust returning oil

back into the tank below the level of fluid in the tank. Filter and strainer must be removable without dismantling the tank from the vehicle.

3.4.1.10. High Coolant Temperature Warning. The high coolant temperature warning shall be activated when coolant temperature is at the warranted operational temperature and in no event shall it fail to activate by the time the temperature reaches 5^{o} F above the warranted temperature.

3.4.2. Exhaust System. The exhaust system shall conform to FMCSR 393.83. The exhaust system as installed shall be gas tight and leakproof to prevent the accumulation of exhaust gas in personnel occupied areas. The exhaust system shall be so located such that ignition of fuel from fuel system is minimized in the event a leak occurs from either system or spillage occurs during refueling. Exhaust mufflers and tail pipes shall be corrosion resistant (i.e. fabricated from stainless steel stock) with adequate guards to prevent personnel contact. Also, exhaust system mounting brackets and fasteners shall protect against dissimilar metal corrosion. Weather caps shall be provided on vertical exhaust stacks.

3.4.2.1. Toxic Gas Exposure. Operating and maintenance personnel shall not be exposed to concentrations of toxic gasses, in accordance with MIL-STD-1472.

3.4.3. Power Train.

3.4.3.1. Transmission. The transmission shall meet the requirements of FMVSS 102. The transmission shall shift automatically in all forward ranges per SAE J645, and require no operator action uncommon to standard automatic transmissions. Exception to automatic shift may be made if manual shift to a single lower gear/range is in lieu of a two-speed transfer case, and is necessary only during extremes of the vehicle mission. It must have a gear range capable of meeting the performance specification. The main transmission shall include the following:

3.4.3.1.1. Inhibitor System. A reverse and down shift inhibitor system that prevents driver shift control action from overspeeding or damaging engine, transmission, or drive train components.

3.4.3.1.2. Transmission Filter. The transmission shall have a transmission fluid filter(s) which is replaceable in 1.0 man-hours or less (for each filter) and a heat exchanger which does not rely on air flow over the transmission, as recommended by the transmission manufacturer for the intended application.

3.4.3.1.3. Transmission Control System. An electronic transmission control system is required that meets the HAEMP requirements. A neutral interlock shall be used to insure that vehicle does not start in any forward or reverse gear.

3.4.3.1.4. RESERVED.

3.4.3.2. Transfer Case. It is required that the transfer case provide torque proportioning full time all wheel drive to both the front and rear axles simultaneously. A multi-speed transfer case must possess a neutral range and either provide shift-on-the-move capability or a minimum low range speed of at least 25 mph (40 km/h).

3.4.3.3. Differential. The differentials shall possess adequate strength and durability to perform the required duty cycles. If torque biasing is utilized, the rear differentials shall continuously and automatically provide output torque biasing such that without wheel slip and during turns they are capable of delivering continuously variable unequal/equal torque to both wheels. The torque biasing shall not affect the 50-50 torque division on turns or on irregular terrain where required.

3.4.4. Frame. Frame rails shall be of a 110 ksi minimum steel design. The frames shall employ structural members which provide optimum section efficiency for torsional and bending stiffness. Frame shall be of a design

to prevent permanent torsional warping, twist and deflection due to bending throughout the operating profile of the vehicle. (see Table III-IX).

3.4.5. Suspension.

3.4.5.1. Suspension and Axles. The vehicle shall be equipped with front and rear axle(s) and suspension system with components having a rated capacity at least equal to the maximum load at GCW that can be imposed on each member measured at the ground. The suspension design shall limit the vertical natural frequency of the sprung mass to a maximum of 1.5 hertz.

3.4.5.2. Wheels, Rims, and Tires. Vehicle shall be equipped with single front and single rear wheels on all models. Rims and tires shall conform to FMVSS 119, 120, SAE J2014, and SAE or Tire and Rim Association recommendations for the type and size tires furnished. A bead-lock feature shall be provided if necessary for low pressure operation. All tires, rims wheels, and lug nuts shall be identical for all vehicles, to include trailers. The tires shall be tubeless radial ply design with a minimum 10,000 mile (16090 km) life, demonstrate good lateral stability for operation on wet highways and have an aggressive tread for good off-road mobility in all terrain to include mud, snow and sand. The tire/wheel shall maintain sufficient clearance to accept military style tire chains for arctic operations. Vehicle shall be equipped with rim covers to protect CTIS components on the wheel exterior. Covers shall be designed to minimize debris accumulation and heat build up such that CTIS component reliability is not degraded. Tire chains are not required to be used on the third axle of the Tractor model. Tires shall be of rated capacity at least equal to the load imposed on each tire measured at each wheel at the ground. Tires shall be repairable and replaceable at Organizational level. Special tools must be identified. A spare tire, wheel/rim assembly, and carrier shall be provided. A mechanical assist device shall be provided which shall permit dismounting and restowing of the spare assembly by no more than two crew members, one crew member preferred, within 30 minutes. Design shall facilitate inflation, deflation and pressure gauging with standard tools. If necessary to meet other requirements, a cab controlled tire inflation/deflation system shall be furnished, in accordance with Annex K.

3.4.5.3. Tire Tread Design. Tire tread design shall be unidirectional and have suitable treads to allow the vehicle to develop a drawbar pull of 0.4 times the vehicle curb weight on a level clean clay surface (CL in USCS Soil Classification System) with a strength of 200 or greater Rating Core Index (RCI) immediately after a 1/2 inch (1.3 cm) rainfall per hour intensity storm.

3.4.5.4. Shock Absorber. Control of wheel jounce and rebound dynamics shall be provided consistent with suspension system design.

3.4.6. Steering Lock. The vehicle shall be equipped with a method of securing the steering wheel by utilization of a standard padlock and key.

3.4.7. Windshield. When assembled, cab windshield and seals shall not allow more than 5 drops of water leakage past the seals when exposed to a spray of water from a supply source of 10 gpm minimum from a ¾ inch hose at a distance of 18 inches (21 inches maximum) for a duration of not less than 3 minutes.

3.4.7.1. Location. All vehicle glazing shall be located to insure that the area to be defrosted, designated as Area A, specified in SAE J382, lies totally on the windshield.

3.4.7.2. Glazing. All glazing is to be done in accordance with FMVSS 205.

3.4.7.3. Windshield Wiper and Washers. Vehicle shall be equipped with multi-speed windshield wipers and washers meeting requirements of SAE J198, (Windshield Wiper Electric Motor in accordance with P/N 12414349). Washer reservoirs shall hold up to 3 quarts of commercial windshield solvent for normal climates.

Washer motor and system shall be operable down to -50° F when equipped with washer fluid rated down to -50° F. Washer reservoir shall not leak when the cab is rotated forward for maintenance.

3.4.8. Bumpers and Towing Devices. Front bumpers, and front and rear towing devices, shall be provided. Rear end protection shall be IAW FMCSR 393.86 to the maximum extent practical while not reducing vehicle/trailer departure angles from those specified herein. Bumpers and towing devices shall be fastened to the vehicle frame with sufficient structural integrity to withstand vehicle recovery, from the front or rear, and lifting/towing by standard Army 5 and 10 Ton wreckers using Army Towbar 7551383. An adjustable swivel pintle assembly, Ordnance part number 8710630, shall be provided at the rear and positioned to accommodate the lunette height of FMTV trailers, Howitzers and pintle- towed trailers currently towed by 1 1/4, 2 1/2 and 5 Ton trucks similar to the FMTV. Towing devices shall conform to FMCSR 393.70. Suitable connectors, including 12 volt electrical connectors at the front and 12 & 24 volt electrical connectors at the rear of the vehicle for activation of towed vehicle brake and warning lights, and an air supply for trailer and towed vehicle air or air over hydraulic brake system shall be provided. The pintle assembly shall not be more than 4 inches (6 inches for MTV Expansible Van) forward of the rearmost part of the vehicle. The mounting of the pintle assembly shall include reinforcements (where necessary) to transfer vertical pintle loads of up to 2,100 lb. to the web of the MTV chassis frame, and 1,200 lb. to the web of the LMTV chassis frame without damage or permanent deformation. Provision for attachment of trailer safety chains shall be in conformance with SAE J849 (per truck installation note). Either (a) the vehicle shall be compatible with the existing FMTV Howitzer pintle extension kit or (b) the vehicle pintle shall be located and/or extended such that the vehicle glad-hands, mud flaps, and rear light carriers are not impacted by trailer turning, specifically the M198 Howitzer (towed), both with no detrimental effect on chassis-trailer mobility.

3.4.9. Heater and Defroster. A personnel heater with defroster louvers and with blower(s) shall be provided which meets the cab temperature and heat distribution requirements of para M.1.1 of Annex M at ambient temperatures down to -25° F. Blower shall be operable independent of water flow to heater and coolant flow to the heater core shall also be controllable over the operational range. Outside fresh air shall be supplied at minimum rate of 1.71 m^3 (60 ft^3)/min. Air flow rates for hot-climate operation (temperatures above 32° C (90° F)) shall be supplied at minimum rate of 8.2 m^3 (305 ft^3)/min. Air velocity at each person's head location shall be adjustable either continuously or with not less than three settings (off, low and high) from near zero to at least 120 m (400 ft)/minute. Windshield defrosting and defogging system shall conform to MIL-STD-1180, Requirement 103, Class 1 for -25° F.

3.4.10. Controls and Operating Mechanisms. Manufacturer's standard controls and operating mechanisms shall conform to FMVSS 101, except for the master lighting switch, all lighting functions controlled by the military main lighting switch, seatbelt telltale, windshield washer/wiper controls illumination, and engine start/stop designator and illumination. MIL-HDBK-1271 shall be used as a guide for symbols to assist identification of military-peculiar controls and operating mechanisms and any controls and operating mechanisms other than those required by FMVSS 101 when, in the manufacturer's judgement and with the concurrence of the PCO, use of word identifiers is insufficient or impractical.

3.4.11. Accessories and Equipment. Chassis equipment, not specified herein, furnished as standard commercial equipment by the manufacturer, shall be modified as required to meet this specification.

3.4.12. Rear View Mirrors. Rear view mirrors and convex mirrors shall be provided on each side. Mirrors shall conform to FMVSS 111 and FMCSR 393.80. Both sections shall be separately adjustable. The mirror casing shall be adjustable and capable of folding toward the body sides, to meet transportability specified dimensional requirements of 96 inch (244 cm). The rear view mirror arms shall be re-adjusting and self-indexing without the use of tools.

3.4.13. Drain Plugs. Drain plugs installed in engine, transmission, transfer case, and axles shall be of the magnetic type (MS equivalent) and be readily accessible to maintenance personnel.

3.4.14. Electrical System. Vehicle shall be equipped with a 24 volt D.C., waterproof, electrical system with a 12 volt D.C. lighting system. Electrical system shall be in accordance with FMCSR 393.27 through 393.33. The 24 volt D.C. electric power circuits shall conform to the MIL-STD-1275. Reverse polarity protection shall be incorporated in the system. All circuit breakers shall be readily accessible manual resetting type, except where automatic resetting type is used.

3.4.14.1. Charging and Regulating System.

3.4.14.1.1. Alternator. Vehicle shall be equipped with a 100 amp, 12 & 24 volt DC radio suppressed alternator, which shall provide sufficient current to operate all electrical components when engine is operating at idle speed, or 200 amp kit if necessary for the particular model. The 100 amp alternator shall comply with the performance requirements of drawing #12420852. The alternator shall be configured to prevent internal alternator corrosion during its expected normal service life.

3.4.14.1.2. Regulating System. Vehicle shall be equipped with a 100 amp dual voltage charging system that will provide up to full alternator output on demand to either the 24 volt load requirement, the 12 volt load requirement, or any combination thereof, from a single 100 amp, 12 & 24 volt DC alternator and, when mounted, a 200 amp kit. The dual voltage control system must be capable of maintaining battery equalization and battery balance when batteries are unmatched or in the same state of charge and provide for separate voltage regulation for the batteries of each voltage system.

3.4.14.2. Starter. Vehicle shall be equipped with a starter conforming to A-A-59294. Starter protection shall prevent re-engagement of the starter with the engine running. The starter must be capable of re-engaging within two seconds (maximum) after the engine is stopped. The starter shall be sufficiently sealed and/or its mounting housing sufficiently vented to prevent starter corrosion.

3.4.14.3. Lighting. All vehicle lights, reflectors, and wiring shall be as specified herein. All vehicle exterior lights shall be mounted in protective locations, or protected to preclude any damage when interfacing with other vehicles, ancillary equipment, specified herein, or caused by terrain or natural obstacles. Polycarbonate lens shall be provided in all lights except sealed beam headlights. Vehicle shall be equipped with lamps, reflective devices, and associated equipment in accordance with FMVSS 108, except a) license plate lamps are not required, and b) activation of hazard warning lights shall require operation of not more than one switch in addition to the vehicle master power switch. All lamps shall be 12 volt and all connections shall be waterproof. Turn signals shall be of the self-canceling type. Marker light styles may vary based on the position on the vehicle at which they are used; variance shall be carried across all models (for example: all rear marker lights will be the same on all models, however the rear marker lights do not have to be the same as the front marker lights) to the maximum extent possible.

3.4.14.4. Wiring. Wiring shall be in accordance with SAE J1292 and J163. Chassis junction boxes (if required) shall be furnished at multiple disconnect points. Unless otherwise specified herein, wiring not protected from accidental contact with troops, terrain, or vegetation shall be a minimum of #14 AWG. Wiring shall be coded IAW Ordnance Drawing 7070301 except where otherwise indicated. Sufficient spacing and routing and cabling of sufficient flexibility shall be utilized to prevent arcing between terminals.

3.4.14.5. Batteries. Batteries in accordance with MS 52149-2 shall be furnished. Batteries shall be readily accessible for service. Negative ground shall be provided. The battery carrier shall not be located where fuel could drip on batteries. Battery carrier shall be outside the crew or passenger compartment, enclosed and insulated to prevent short-circuiting during maintenance or operation and vented to prevent build-up of gasses. The battery box lid and attendant battery casing shall be designed to prevent damage due to normal installation and use and shall seal batteries and attendant cabling from external road debris and road/tire spray.

3.4.14.5.1. Master Electrical Power Switch. A master electrical power switch shall be provided left of and lower than the steering column (as observed by driver) to allow the operator to shut off all battery power to the rest of the vehicle. The master electrical cutoff shall also turn off the engine before disconnecting electrical power.

3.4.14.5.2. External Ignition Control (EIC). The vehicle shall be equipped with an external ignition control (EIC) that shall allow the operator/maintainer to 1) turn the ignition on and off and 2) start and stop the engine, while the cab is tilted forward and without requiring the operator/maintainer to enter the cab. The EIC shall not override the master electrical power switch.

3.4.14.6. Horn. Vehicle shall be equipped with a 12 or 24 volt electric horn. Horn is exempt from EME/EMI requirements.

3.4.14.7. Electrical Connector. Vehicle shall be equipped with all connectors necessary to operate electrical components of towed military trailers and all necessary connectors in front of the vehicle to operate electrical components of the vehicle when being towed by a like vehicle. Vehicle shall also be equipped with slave receptacle for intervehicle cable slave starting with vehicle batteries. The slave receptacle shall be in accordance with 12342303, and a cap assembly in accordance with 12342306. Waterproof/moisture-proofed with approved potting compounds, Packard Type connectors, or equivalent, shall be employed for all electrical connections. All junction boxes (interiors) shall be treated with Vapor Chemical Inhibitors (VCI) coating or emitters. Connections located in areas not below the fording line or in areas where direct exposure to water is not anticipated (i.e. inside cab) do not require waterproof connectors. Connections in areas below the fording line and in areas where direct exposure to rain, road spray, and cleaning spray is unavoidable shall be waterproof connectors.

3.4.14.8. Instruments. The vehicle shall be equipped with gauges/indicators which shall be readily visible to the full range of user personnel, adequately lighted for normal operation and with infrared radiation emission levels, when lighted for blackout condition operation, in accordance with MIL-STD-1179, except that infrared radiation emission levels for those indicator lights which must be red in color shall not exceed 10% of the peak emission level.

3.4.14.9. Audible Warnings. Audible warning shall sound in the event of low vehicle air pressure.

3.4.14.10. Ignition Switch. Vehicle shall be equipped with an ignition switch that prevents damage to communication/radio and any other electrical/electronic accessories that draw power through the vehicle's power distribution system due to voltage/current spikes while the vehicle starter is engaged. Those components, sub-systems, and/or systems that draw power directly from the vehicle's batteries will not be protected by the ignition switch. Sufficient power from the vehicle's batteries shall be transmitted to the starter while the ignition switch is activated to ensure vehicle start under all climatic conditions.

3.4.15. Control Cables. If applicable, all control cables going outside the cab shall be of the low friction type protected at both ends with adequate seals to prevent entry of moisture and contamination into the support tube and to provide a bearing surface for smooth motion of the end rod. Cables shall be routed in such a way as to insure freedom of movement in both directions without braiding or kinking.

3.4.16. Wheel Splash and Stone Throw Protection. Rigid fenders or flexible splash shields shall be installed with sufficient clearance for operation while using military standard tire chains (Reference A-A-52507). Protection to the rear against rear wheel splash and stone throw shall include anti-sail mud flaps that will not be lifted up by high speed air flow and be in accordance with SAE J682. If pinned under wheels or other objects, mudflaps shall tear away without causing any damage to supporting structures. Vehicle design shall to the maximum practical extent prevent wheel splash and stone throw damage to other parts of the vehicle, i.e., battery compartment; fuel, air and hydraulic tanks and components; vehicle framing; electrical, pneumatic and hydraulic tubing; harnesses and electrical components; drive train and cooling system; exhaust system; wheels and rims;

suspension system. Rear light carriers shall be designed or braced to permit emergency use as a step without damage other than fair wear and tear.

3.4.17. Rifle Mount. Vehicles shall be provided with racks/mounts inside the cab for three (3) M16A2/M4 rifles with and without the following the following accessories attached:

a. M203 Grenade Launcher
b. 30 round clip
c. Blank adapter
d. Flash Adapter
e. MILES Adapter

Location shall provide ready access for the crewmembers.

3.4.18. Communication/Intelligence System Equipment. The vehicles shall have space allocations, antenna allocations and be structurally designed and built to accept holes and attachment brackets and provide power outlets needed to mount, power and operate major components for each/combinations of the AN-VRC 46, 47, and 49 and SINCGARS communications systems. Equipment shall be operable from both seating positions inside the cab. Typical communication system combinations are listed below:

a. AN-VRC-46 with one KY-57.
b. AN-VRC-47 with two KY-57s.
c. AN-VRC-49 with two KY-57s.
d. SINCGARS (Single Channel Ground & Airborne Radios) with one KY-57.
e. SINCGARS with two KY-57s

3.4.19. Vehicle Winch. Vehicles designated as models with winch (w/w or w/winch) shall have a self-recovery winch as specified herein. The vehicle winch shall be front or central mounted for self-recovery for forward deployment. The self-recovery winch shall be capable of both forward and rearward deployment. All FMTV models shall be configured to accept the vehicle winch which shall include all controls, electrical, hydraulic and mechanical linkage as necessary and all items necessary for permanent installation and operation. The winch shall be provided with a free spooling capability to permit rapid deployment of the line. The winch shall have sufficient braking devices to safely lower and hold its full rated load. Winch braking must be automatic and be fully engaged any time the winch is stopped or not in use, and must be essentially released during reel-in operation. With winch installed, the vehicle shall meet all approach and departure angles and ground clearance requirements. The winch shall provide a minimum specified line pull of 10,000 lb. (4,536 kg) +/-10% (LMTV), and 15,500 lb. (6804 kg) +/-10% (MTV) from a bare drum 1st layer (and not less than 50% of that force from the top layer) with a minimum line speed of 15 ft/min (5 m) from a bare drum. Winch cable shall be at least 280 feet in length, with a breaking strength to exceed 50% above maximum line pull capacity. A device shall be provided and set to prevent damage to any of the winching system components or their mating parts. End of wire rope shall be equipped with removable clevis. Roller assemblies shall be located at the front of the vehicle to guide the cable. All winch functions, with the exception of the free-spooling, shall be controllable from the driver's position only. Winch free-spooling shall be controllable from the winch only. All controls shall be of the dead man type that revert to neutral (except free spool) when released. A snatch block shall be provided with the truck to permit using a two part line. Storage for this hardware shall be provided. Winch design shall be in compliance with SAE J706. The maximum continuous rating shall be such that an 85 meter line pull can be accomplished at 120°F ambient at the top layer line pull rating without exceeding a lube oil temperature of 250°F (if hydraulic) or damaging the safety brake.

4. QUALITY ASSURANCE PROVISIONS.

4.1. Responsibility for Inspection. The contractor is responsible for the performance of all inspection requirements as specified herein. The contractor may use his own or any facility suitable for the performance of the

inspection requirements specified herein, if approved by the Government. The Government reserves the right to perform or witness any inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1. Responsibility for Compliance. The contractor shall assure all items produced meet all requirements of ATPD 2131C. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program.

4.1.2. Inspection Equipment. The contractor is responsible for the provision and maintenance of all inspection equipment necessary to assure that supplies and services conform to contract requirements. Calibration of inspection equipment shall be IAW ANSI/NCSL Z540-1, ISO 10012-1, or comparable standard.

4.1.3. Qualified Products. When a part or component is specified to conform to a specification having a Qualified Products List (QPL), the contractor shall make available to the Government, documentation of each item acquisition from such QPL. The documentation shall include the QPL date and identification of the supplier, purchase order, and quantity.

4.1.4. Certification. Where certification is required to verify material or component conformance to a specification, the contractor shall furnish such certification along with documented test results and performance and analytical data, as applicable. The certification(s) and documented test results shall be updated if changes to the materiel or component(s) are made.

4.1.5. Test Facilities. The contractor is responsible for maintaining test facilities and courses, at place of manufacture, for assuring the minimum requirements of this specification are met. These facilities include, but are not limited to:

a. Relatively level, hard-surfaced, test track/route of contractor design and a roller-type test fixture.

b. Slopes (As specified in para3.2.1.1). (27% slope for tractor optional)

4.1.6. Production Break-In/Run-In. All vehicles, shall have the minimum required “break-in”/”run-in” performed by the contractor prior to offering such vehicles for Government acceptance. All components or parts, incorporated into the final end items, shall have the manufacturer’s recommended “break-in”/”run-in” requirements performed by either the contractor or subcontractor, prior to offering the final end item for Government acceptance. The contractor, when requested, shall make available to the Government, at the time of any Government inspection, documentation delineating the manufacturer’s recommended “break-in”/”run-in” of components, parts, or final end item.

4.2. RESERVED.

4.3. First Article Inspection. First article inspection shall be performed on the first production vehicle of each variant type and on additional vehicle(s) as specified, randomly selected by the government, which shall be designated as "initial production vehicle(s)".

4.3.1. First Production Vehicle Inspection (FPVI).

4.3.1.1. In-Process Inspection. During fabrication of the first production vehicle of each variant type, in-process inspections shall be conducted to determine conformance of materials and workmanship to specified requirements. These inspections shall be made at the contractor's or subcontractor's facilities, prior to the application of primer and paint. Processing and welding procedures, quality system, inspection records, calibration

procedures, non-destructive test procedures, and welder certifications will be reviewed and evaluated during the in-process inspections.

4.3.1.2. Completed First Vehicle Inspections.

4.3.1.2.1. Contractor Inspection. The first production vehicle of each variant type shall be inspected and road tested by the contractor at the place of manufacture. The first production vehicle inspection shall include, as a minimum, the inspections referenced in Table II. The road test shall be conducted with actual or simulated payload, on a smooth relatively level hard-surfaced road, for a distance of not less than 150 miles. Upon completion of testing, the contractor shall submit the vehicle, and make available all inspection records and certifications, to the responsible Government inspection element at contractor's plant, for preliminary inspection. The Government, at its option, may elect to witness, and/or participate, in the contractor's inspections and road tests.

4.3.1.2.2. Repair of Defects. Defects found on all production vehicles shall be corrected by the contractor.

4.3.1.2.3. Vehicle Disposition. FPVI vehicles may be selected by the Government as Production Verification Test (PVT) vehicles.

4.3.1.2.4. Final Approval and Acceptance. Final approval and acceptance by the Government, of the first production vehicle of a specific model, will be withheld until the Production Verification testing, specified in para 4.3.2, has been completed, and a final determination has been made regarding conformity of the vehicle to contractual requirements, including, but not limited to, workmanship and materials.

4.3.2. Production Verification Test (PVT). To determine conformance to Section 3 (inclusive), after completion of the first production vehicle inspection (see 4.3.1), production vehicles of each configuration shall be randomly selected by the Government. These vehicles shall be subjected to a 20,000 mi. RAM-D test, per Tables II through IX. In the event the production contract delineates test of less than 20,000 mi., the mileage course mix shall remain the same for the revised mileage as per Tables III through IX. Quantity of test vehicles and configurations to be tested shall be delineated in the production contract. Such tests shall be conducted by the Government at a Government selected test site(s). The vehicles shall be tested with actual or simulated payload.

NOTE: 90% of the mileage specified for each course shall be performed with payload. The remaining 10% of the mileage shall be performed without payload. 25% of each course shall be run with the vehicles towing a trailer at its GVW. Payloads for truck tractors, with semitrailer, will be determined by the Government as to proper weight distribution and 5th wheel load for 46,000 lb towed load. A loaded M871 will be utilized for performance testing of the tractor. Wrecker payload (MTV cargo truck loaded, front lift towed) will be towed for 35% of mileage shown in the Classification of Inspections and Tests.

4.3.2.1. Reliability Conformance.

4.3.2.1.1. Mean Miles Between Hardware Mission Failures (MMBHMF). A vehicle performance test shall be conducted to verify that the Mean Miles Between Hardware Mission Failure (MMBHMF) requirements, for all body types, as specified in 3.2.4, has been attained utilizing test data (i.e., Test Incident Reports (TIRs)).

4.3.2.1.2. Maintainability. The maintainability design requirements shall be verified, for conformance to 3.2.4, during the test operations in an environment which simulates the vehicle’s operational and maintenance conditions. The maintenance ratio (MR) shall be computed, upon completion of the test, utilizing the scheduled and unscheduled man-hour data recorded in the final test report. The MR shall not exceed those specified in Table I, Section 3.

4.3.2.1.3. Durability. To verify conformance to 3.2.5, the test vehicle(s) shall, with a confidence level of 50%, demonstrate at least a 0.6 probability of completing the schedule test mileage without a replacement or overhaul as specified.

4.3.2.1.4. Failure Definition/Scoring Criteria (FD/SC). The Government will unilaterally determine conformance to 3.2.3 and 3.2.4, by scoring failure incidents and severity classification on each vehicle, using the FD/SC designated.

4.3.2.1.5. RESERVED.

CLASSIFICATION OF INSPECTIONS AND TESTS
TABLE II

The inspections/tests referenced in Table II (inclusive) may be modified at the discretion of the Government by the deletion or addition of examinations to assure adherence to specification/contractual requirements. A "+" next to the text means it is a Certification Requirement. QCI testing may be performed at vehicle curb weight (VCW). The Government has the option of performing or not performing any individual test (PVT and FPT) listed below during Government testing.

First Production Vehicle Inspection	Place of Manufacture
Production Verification Test (PVT)	Government Proving Grounds
Quality Conformance Inspection (QCI)	Place of Manufacture
Control Test (CT)	Place of Manufacture
Follow-on Production Test (FPT)	Government Proving Grounds

TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
ALL VEHICLES							
First Production Vehicle		4.3.1	X				
Prod Verification Test		4.3.2		X			
Quality Conf. Inspection		4.4			X		
Control Test		4.5				X	
Follow-on Prod Test		4.6					X
Grade Operation	3.2.1.1	4.7.1	X	X	X		X
Side Slope Operation	3.2.1.2	4.7.1	X	X	X		X
Steering and Handling	3.2.1.3	4.7.2	X	X			X
Speed	3.2.1.4	4.7.3		X			X
Turning	3.2.1.5	4.7.4	X	X		X	X
Vertical Step	3.2.1.6	4.7.5		X			X
Fording	3.2.1.7	4.7.6.1		X			X
Range	3.2.1.8	4.7.7		X			X
Noise	3.2.1.9	4.7.8	X+	X			
Emission	3.2.1.10	4.7.9	X+				
Braking	3.2.1.11	4.7.10	X+	X			
Service Brakes	3.2.1.11.1	4.7.10.1	X	X	X	X	X
Parking Brakes	3.2.1.11.2	4.7.10.2	X	X	X	X	X
Emergency Brakes	3.2.1.11.3	4.7.10.3	X+	X		X	X
Glad Hands	3.2.1.11.4	4.7.10.4	X	X	X	X	X
EME/EMI	3.2.1.12.1	4.7.11.1		X			X

HAEMP	3.2.1.12.2	4.7.11.2		X			
Blackout Lighting	3.2.1.12.3	4.7.11.3	X+	X			X
Mobility	3.2.1.13	4.7.12	X	X			
Vehicle Cone Index	3.2.1.13.1	4.7.12.1		X			
Ride Quality	3.2.1.14	4.7.14		X			
Approach/Depart Angle	3.2.1.15	4.7.15	X	X			X
Ground Clearance	3.2.1.16	4.7.16	X	X			X
Towing a Like Vehicle	3.2.1.17	4.7.17	X	X			X
Dimensions	3.2.2.1	4.7.18	X	X			X
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Vehicle Loading	3.2.2.2	4.7.19		X			X
Painting	3.2.2.3.1	4.7.20	X		X	X	
Corrosion Control	3.2.2.3.3	4.7.21	X		X		
Dissimilar Metals	3.2.2.3.5	4.7.22	X				
Non-Skid Surfaces	3.2.2.3.6	4.7.23	X				
Reliability	3.2.3	4.7.24		X			
Maintainability	3.2.4	4.7.25		X			
Engine & Powertrain Durability	3.2.5	4.7.26		X			X
Engine Accessibility	3.2.5.1	4.7.27		X			
Army Oil Analysis	3.2.5.2	4.7.28	X	X	X		
Chemical Agents Equipment	3.2.6	4.7.29	X	X	X		
Environmental Condition	3.2.7	4.7.30		X			X
Transportability	3.2.8	4.7.31, 4.7.31.1		X			X
Medium Lift Helicopter	3.2.8.1	4.7.31.2		X			
Cargo Aircraft	3.2.8.2	4.7.31.3		X			
Airdrop	3.2.8.3	4.7.31.4		X			
Rail Impact Test	3.2.8.4	4.7.31.5		X			
Lifting & Tiedown Provisions	3.2.8.5	4.7.31.6	X+	X			
Cab	3.2.9	4.7.32	X+	X			
Water Resistance	3.2.9.1	4.7.32.1		X		X	
Vibration Resistance	3.2.9.2	4.7.32.2	X+				
Material	3.3.1	4.7.33	X			X	
Component Ratings	3.3.1.1	4.7.33.1	X+				
Flammability	3.3.1.2	4.7.33.2	X+				
Nameplates or Markings	3.3.2	4.7.34	X	X	X	X	X
Vehicle Weight Sign Kit	3.3.2.1	4.7.34.1	X		X		
Workmanship	3.3.3	4.7.35	X	X	X	X	X
Welding	3.3.3.1	4.7.35.1	X		X		
Safety	3.3.4	4.7.36	X+	X	X	X	X
Human Engineering	3.3.5	4.7.37	X	X			X
Engine	3.4.1	4.7.38	X+	X	X	X	X
Test Equipment	3.4.1.1	4.7.39	X	X		X	X
HD Cooling System	3.4.1.2	4.7.40		X			X
Engine Coolant	3.4.1.3	4.7.40.1	X+	X		X	X
Engine Air Induction System	3.4.1.4	4.7.41	X	X	X		X
Air Cleaner	3.4.1.5	4.7.42	X+		X		
Oil Filter	3.4.1.6	4.7.43	X+	X	X	X	X
Fuel System	3.4.1.7	4.7.44	X+	X	X		
Fuel Tank(s)	3.4.1.8	4.7.45	X+	X		X	X

Fuels and Lubricants	3.4.1.9	4.7.46	X+	X	X		X
High Coolant Temp Warning	3.4.1.10	4.7.47	X	X			X
Exhaust System	3.4.2	4.7.48	X+	X	X	X	X
Toxic Gas Exposure	3.4.2.1	4.7.48.1	X+	X			X
Power Train Test	3.4.3	4.7.49		X			X
Transmission	3.4.3.1	4.7.49.1	X+	X	X		X
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Inhibitor System	3.4.3.1.1	4.7.49.2	X	X	X		
Transmission Filter Test	3.4.3.1.2	4.7.49.3		X			X
Transmission Control System	3.4.3.1.3	4.7.49.4		X	X	X	X
Transfer Case	3.4.3.2	4.7.50	X	X			X
Differential	3.4.3.3	4.7.51	X	X	X		X
Frame	3.4.4	4.7.52	X+	X			X
Suspension & Axles	3.4.5.1	4.7.53	X	X	X		X
Wheels, Rims, & Tires	3.4.5.2	4.7.54	X+	X	X		
Tire Tread Design	3.4.5.3	4.7.55		X			X
Shock Absorbers	3.4.5.4	4.7.56	X	X	X		X
Steering Lock	3.4.6	4.7.57	X	X	X	X	
Wipers and Washers	3.4.7.3	4.7.58	X+	X	X	X	X
Bumpers & Towing	3.4.8	4.7.59	X+	X			X
Heater & Defroster	3.4.9	4.7.60	X+	X	X	X	X
Controls & Operating Mechanisms	3.4.10	4.7.61	X+	X	X	X	X
Accessories & Equip	3.4.11	4.7.62	X	X	X	X	X
Rear View Mirrors	3.4.12	4.7.63	X	X	X	X	X
Drain Plugs	3.4.13	4.7.64	X	X		X	X
Electrical System	3.4.14	4.7.65	X+	X	X	X	
Alternator	3.4.14.1.1	4.7.66.1	X	X	X		
Regulating System	3.4.14.1.2	4.7.66.2	X	X	X	X	
Starter	3.4.14.2	4.7.67	X	X	X	X	
Lighting	3.4.14.3	4.7.68	X+		X		
Wiring	3.4.14.4	4.7.69	X	X			
Batteries	3.4.14.5	4.7.70	X+	X	X		
Horn	3.4.14.6	4.7.71	X	X	X	X	
Electrical Connector	3.4.14.7	4.7.72	X	X	X		
Instruments	3.4.14.8	4.7.73	X	X	X		X
Audible Warnings	3.4.14.9	4.7.74	X	X	X		X
Ignition Switch	3.4.14.10	4.7.75	X	X	X		X
Control Cables	3.4.15	4.7.76	X	X	X		
Wheel Splash & Stone Throw Protection	3.4.16	4.7.77	X	X	X	X	
Rifle Mount	3.4.17	4.7.78	X	X		X	
Communication/Intel System Equipment	3.4.18	4.7.79	X	X			X
Vehicle Winch	3.4.19	4.7.80	X+	X		X	X
ANNEX A							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT

General	A.2	A.4	X	X	X	X	X
Cargo Bed Tiedowns	A.2.1	A.4.1	X+	X		X	X
Trucks, Standard Cargo	A.3.1	A.4.2	X	X	X		X
Trucks, Long Cargo	A.3.2	A.4.3	X	X	X		X
MTV Crane	A.3.3	A.4.4	X+	X		X	X
Location and Capability	A.3.3.1	A.4.4.1	X+	X	X	X	
Stabilizing System	A.3.3.2	A.4.4.2	X+	X		X	X
Crane Hydraulic System & Control	A.3.3.3	A.4.4.3	X+	X			X
Fixed Operator's Station	A.3.3.4	A.4.4.4	X	X		X	X
Remote Control	A.3.3.5	A.4.4.5	X+	X		X	X
Transportability	A.3.3.6	A.4.4.6	X	X			X
Overload Shutdown System Test	A.3.3.7	A.4.4.7	X	X		X	X
Line Load Winch	A.3.3.8	A.4.4.8	X+	X	X	X	X
Signs	A.3.3.9 (inclusive)	A.4.4.9 (inclusive)	X	X	X	X	
ANNEX B							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
General	B.2	B.4	X	X			X
Dump Body	B.3.1	B.4.1		X			
Dump Angle	B.3.1.1	B.4.2	X	X			X
Safety Lock	B.3.1.2	B.4.3	X	X	X	X	X
Attachments	B.3.1.3	B.4.4	X	X		X	X
Cab Protector	B.3.1.4	B.4.5	X	X			X
Tailgate	B.3.1.5	B.4.6	X	X	X	X	X
Dump Bed Tiedowns	B.3.1.6	B.4.7	X	X			X
Ladder	B.3.1.7	B.4.8	X	X	X	X	X
Volcano Mine Dispensing System	B.3.1.8	B.4.9		X			X
ANNEX C							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Van (General Req.)	C.2	C.4.1	X	X			X
Expansible Van Body	C.3.1.1	C.4.1.1	X	X	X	X	X
Roof	C.3.1.1.1	C.4.1.2		X			X
Dimensions	C.3.1.1.2	C.4.1.1	X	X			X
Transportability	C.3.1.1.3	C.4.1.3		X			X
Air Transport	C.3.1.1.4	C.4.1.3		X			X
Waterproofness	C.3.1.1.5	C.4.1.4	X	X	X	X	X
Seals	C.3.1.1.5.1	C.4.1.5		X			X
Door Latches	C.3.1.1.6.1.1	C.4.1.6	X	X	X	X	X
Warning Light	C.3.1.1.6.2	C.4.1.6.1	X	X	X	X	X
Steps	C.3.1.1.7 (inclusive)	C.4.1.7	X	X			X
Insulation	C.3.1.1.8	C.4.1.8	X+	X			X
Interior Sound Level	C.3.1.1.9	C.4.1.9		X			X

(Inclusive)							
Floor Loads	C.3.1.1.10	C.4.1.10		X			
Windows	C.3.1.1.11	C.4.1.11	X	X	X	X	X
Electrical System	C.3.1.2 (inclusive)	C.4.2	X+	X	X	X	X
Light Security	C.3.1.3	C.4.2.1	X	X	X	X	X
Blackout Conditions	C.3.1.3.1	C.4.2.2	X	X	X	X	X
Electromagnetic Comp.	3.2.1.12.1	C.4.2.3		X			X
Climate	C.3.1.5	C.4.2.4		X			X
Ventilation	C.3.1.6	C.4.2.5		X			X
Actuation	C.3.1.7	C.4.2.6		X			X
Lubrication	C.3.1.8	C.4.2.7		X			X
Basic Issue Items	C.3.1.9	C.4.2.8	X	X	X	X	X
Interior Painting	C.3.1.10	C.4.2.9	X	X	X	X	X
Cable Reel	C.3.1.11	C.4.2.10	X	X	X	X	X
Stowage	C.3.1.12	C.4.2.11	X	X	X	X	X
ANNEX D							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Fifth Wheel	D.3.1	D.4	X	X	X		
Fifth Wheel Location	D.3.2	D.4.1	X	X			X
Mounting	D.3.3	D.4.2	X+				
Approach Ramps	D.3.4	D.4.3	X+				
Fifth Wheel Height, Load	D.3.5	D.4.4	X	X			X
Deck Plate & Fenders	D.3.6	D.4.5	X	X			X
Hose Tenders & Cable Supports	D.3.7	D.4.6	X		X		
Towed Vehicles	D.3.8	D.4.7		X			X
Trailer Brake Control System	D.3.9	D.4.8	X	X	X	X	X
Work Lamps	D.3.10	D.4.9	X	X	X	X	X
ANNEX E							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Operations	E.2.1	E.4		X			X
Winching	E.2.2	E.4.1		X			X
Lifting/Towing	E.2.3	E.4.2		X	X	X	X
Material Handling	E.2.3.2	E.4.3	X+	X	X	X	X
Fixed Operator's Station	E.2.3.3	E.4.4		X			X
Remote Control	E.2.3.4	E.4.5	X+	X			X
Transportability	E.2.3.5	E.4.6		X			X
Overload Shutdown	E.2.3.6	E.4.7	X	X	X	X	X
Line Load Winch	E.2.3.7	E.4.8	X+	X		X	X
Hydraulic Reservoir	E.2.4	E.4.9	X	X	X	X	X
Signs and Marking	E.2.5	E.4.10	X	X	X	X	X
Main Recovery Winch System	E.2.6	E.4.11	X+	X	X	X	X
Recovery Anchors	E.2.7	E.4.12		X			X
Hydraulic System	E.2.8	E.4.13	X	X			X

Work Lamps	E.2.9	E.4.14	X	X	X	X	X
Other Equipment	E.2.10	E.4.15	X	X			X
BII	E.2.10.1	E.4.15	X	X			X
ANNEX F							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
General Requirements	F.2	F.4	X		X		
Specific Requirements	F.3	F.4.1	X	X		X	
ANNEX G							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
General Requirements	G.2	G.4	X	X		X	
Cargo Bed Tiedowns	G.2.1	G.4.1	X	X		X	
ANNEX H							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Standard Van	H.2.1	H.4	X	X			X
Dimensions	H.3.1.1	H.4.1.1	X	X		X	
Transportability	H.3.1.2	H.4.1.2	X	X			X
Waterproofness	H.3.1.3	H.4.1.3	X	X	X	X	X
Double Rear Doors	H.3.1.4	H.4.1.4	X	X		X	X
Rear Steps	H.3.1.5	H.4.1.5	X	X	X	X	X
Insulation	H.3.1.6	H.4.1.6	X+	X			
Walls and Ceilings	H.3.1.7	H.4.1.7	X	X	X	X	X
Doors, Latches, Hinges & Hardware	H.3.1.8	H.4.1.8	X+	X		X	
Windows	H.3.1.9	H.4.1.9	X	X		X	X
Floor Loads	H.3.1.10	H.4.1.10	X+	X			
Interior Painting	H.3.1.11	H.4.1.10.1	X		X	X	
Roof	H.3.1.12	H.4.1.10.1		X			X
Electrical System	H.3.2	H.4.1.11	X+	X		X	
Van Body Illumination	H.3.2.1	H.4.1.12	X	X		X	X
Light Security	H.3.2.2	H.4.1.13	X	X		X	X
Rear Door Warning Light	H.3.2.3	H.4.1.14	X	X	X	X	X
Blackout Operations	H.3.2.4	H.4.1.15					
Blackout Lights	H.3.2.5	H.4.1.15	X	X	X	X	X
Exterior Power	H.3.2.6.1	H.4.1.16	X	X		X	X
Power Distribution Panel	H.3.2.6.2	H.4.1.17	X	X	X	X	
Switches	H.3.2.6.3	H.4.1.18	X	X	X	X	
Internal Convenience Outlets	H.3.2.6.4	H.4.1.19	X	X	X	X	
Binding Posts	H.3.2.6.5	H.4.1.20	X	X	X	X	
Heater	H.3.2.7	H.4.1.21	X	X	X	X	
Air Conditioner	H.3.2.8	H.4.1.22	X	X	X	X	
Climate	H.3.3	H.4.1.23		X			X
Basic Issue Items	H.3.4	H.4.1.24	X	X	X	X	X

ANNEX I

TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
General Requirements	I.2	I.4	X		X		
Specific Requirements	I.3	I.4.1	X		X		

ANNEX J

TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
General Use	J.2	J.4		X			X
Lateral Stability	J.3.1.1	J.4.1.1		X			X
Tracking	J.3.1.2.1	J.4.1.2	X	X	X	X	X
Turning	J.3.1.2.2	J.4.1.3	X	X	X	X	X
Speed	J.3.1.3	J.4.2		X			X
Fording	J.3.1.4	J.4.3		X			X
Service Brake	J.3.1.5.1	J.4.4	X+	X	X	X	X
Parking Brake	J.3.1.5.2	J.4.5	X	X			X
Emergency Brake	J.3.1.5.3	J.4.6	X	X		X	X
Departure Angle	J.3.1.6	J.4.7	X	X			X
Ground Clearance	J.3.1.7	J.4.8	X	X			
Dimensions	J.3.2.1	J.4.9	X	X		X	
Payload	J.3.2.2.3	J.4.10	X	X		X	X
Protective Coating	J.3.2.3	J.4.13	X		X		
Reliability & Maintainability	J.3.2.4	J.4.14		X			X
Suspension & Axle	J.3.2.5.1	J.4.15		X			X
Wheel Rim & Tires	J.3.2.5.2	J.4.16	X+	X			
Brake System Hoses, Fittings & Couplings	J.3.2.6	J.4.17	X	X	X	X	X
Electrical	J.3.2.7	J.4.18	X	X	X	X	X
Receptacle System	J.3.2.7.1	J.4.19	X	X	X	X	X
Blackout Lighting	J.3.2.7.2	J.4.20	X	X	X	X	X
Connecting Cable , Electrical Intervehicular	J.3.2.7.3	J.4.21	X	X	X	X	X
Reflectors	J.3.2.7.4	J.4.22	X+	X			
Storage Box	J.3.2.8	J.4.23	X	X		X	X
Trailer Cargo Bed	J.3.2.9	J.4.24	X			X	
Landing Gear	J.3.2.10	J.4.25	X	X			X

ANNEX K

TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Tire Pressure Control	K.3.1	K.4	X	X	X	X	X
Provision and Storage of Air	K.3.3	K.4.2 (inclusive)	X	X			X
Manual Tire Inflation/Deflation	K.3.4	K.4.3	X	X		X	X
Air Priority System	K.3.5	K.4.4		X		X	X
Speed/Pressure Control and Warning	K.3.6	K.4.5	X	X	X	X	X
Maintenance of Tire Pressure	K.3.7	K.4.6	X	X		X	X

Operating Environment	K.3.8	K.4.7		X			X
Time to Inflation/Deflation	K.3.9	K.4.8	X	X		X	X
ANNEX L							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
M43 Detector (M8 System)	L.1.1	L.4	X	X	X		
M42 Alarm (M8 System)	L.1.2	L.4.1	X	X			
M256 Portable Chemical Agent Detection Kit	L.4.2	L.4.2	X	X			
M9 Chemical Agent Detector Paper	L.1.4	L.4.3	X	X			
M13 Decontamination Apparatus, Portable	L.1.5	L.4.4	X	X			
Chemical Protective Garments	L.1.6	L.4.5	X				
ANNEX M							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Common Kits/Items	M.1	M.4	X	X		X	
Arctic Kit	M.1.1	M.4.1	X	X		X	X
Cargo Cover Soft Top Kit	M.1.2	M.4.2	X	X		X	
200 Amp Alternator	M.1.3	M.4.3	X	X		X	
Machine Gun Ring	M.1.4	M.4.4	X	X		X	X
Rotating Amber Kit	M.1.5	M.4.5	X	X		X	
Power Take-off Kit	M.1.6	M.4.6	X	X	X		
Light Material Handling Crane Kit	M.1.7	M.4.7	X	X		X	
Tiedown Kits	M.1.8	M.4.8	X	X		X	X
Cargo Area Troop Seats	M.1.9	M.4.9	X	X		X	
Trailer Tank and Pump (TPU) Tiedown Kits	M.1.10	M.4.10	X	X		X	X
Digitization Kits	M.1.11	M.4.11	X	X		X	X
ANNEX N							
TITLE	RQMTS	METHOD	FPVI	PVT	QCI	CT	FPT
Basic Issue Items	N.1	N.4	X	X	X	X	X

TABLE III		
20,000 mile test for MTV cargo, dump, HIMARS RSV, and FMTV chassis		
Course	Distance and Speeds	Payload
Hard-surfaced roads	4,000 miles at varying speeds up to maximum	10,000 lbs.

Secondary roads	10,000 miles at speeds applicable to conditions of terrain	10,000 lbs.
Level Cross-country	2,800 miles at speeds applicable to conditions of terrain	10,000 lbs.
Hilly Cross-country	2,800 miles at speeds applicable to conditions of terrain	10,000 lbs.
Belgian Block	400 miles at speeds applicable to conditions of terrain	10,000 lbs.

TABLE IIIa.		
12,000 mile test for LHS Truck and Trailer		
Course	Distance and Speeds	Payload
Hard-surfaced roads	3,000 miles at varying speeds up to maximum	15,000 lbs.
Secondary roads	6,000 miles at speeds applicable to conditions of terrain	15,000 lbs.
Level Cross-country	1,200 miles at speeds applicable to conditions of terrain	15,000 lbs.
Hilly Cross-country	1,200 miles at speeds applicable to conditions of terrain	15,000 lbs.
Belgian Block	600 miles at speeds applicable to conditions of terrain	15,000 lbs.

TABLE IV		
20,000 mile test for truck tractors in combination		
Course	Distance and Speeds	Payload
Hard-surfaced roads	6,000 miles at varying speeds up to maximum	46,000 lbs.
Secondary roads	11,000 miles at speeds applicable to	46,000 lbs.

	conditions of terrain	
Level and hilly Cross-country	850 miles at speeds applicable to conditions of terrain	46,000 lbs.
Hilly Cross-country	1,850 miles at speeds applicable to conditions of terrain	46,000 lbs.
Belgian Block	300 miles at speeds applicable to conditions of terrain	46,000 lbs.

TABLE V		
20,000 mile test for wrecker		
Course	Distance and Speeds	Payload
Hard-surfaced roads	4,000 miles at varying speeds up to maximum	Wrecker-MTV cargo - GVW
Secondary roads	10,000 miles at speeds applicable to conditions of terrain	Wrecker-MTV cargo - GVW
Level Cross-country	2,800 miles at speeds applicable to conditions of terrain	Wrecker-MTV cargo - GVW
Hilly Cross-country	2,800 miles at speeds applicable to conditions of terrain	Wrecker-MTV cargo - GVW
Belgian Block	400 miles at speeds applicable to conditions of terrain	Wrecker-MTV cargo - GVW

TABLE VI		
20,000 mile test for LMTV cargo model		
Course	Distance and Speeds	Payload
Hard-surfaced roads	4,000 miles at varying speeds up to maximum	5,000 lbs.
Secondary roads	10,000 miles at speeds applicable to conditions of terrain	5,000 lbs.
Level Cross-country	2,800 miles at speeds applicable to conditions of terrain	5,000 lbs.
Hilly Cross-country	2,800 miles at speeds applicable to conditions of terrain	5,000 lbs.
Belgian Block	400 miles at speeds applicable to conditions of terrain	5,000 lbs.

TABLE VII		
20,000 mile test for van models		
Course	Distance and Speeds	Payload
Hard-surfaced roads	4,000 miles at varying speeds up to maximum	5,000 lbs.
Secondary roads	10,000 miles at speeds applicable to conditions of terrain	5,000 lbs.
Level Cross-country	2,800 miles at speeds applicable to conditions of terrain	5,000 lbs.
Hilly Cross-country	2,800 miles at speeds applicable to conditions of terrain	5,000 lbs.
Belgian Block	400 miles at speeds applicable to conditions of terrain	5,000 lbs.

TABLE VIII		
10,000 mile test for MTV trailers		
Course	Distance and Speeds	Payload
Hard-surfaced roads	2,000 miles at varying speeds up to maximum	10,000 lbs.
Secondary roads	5,000 miles at speeds applicable to conditions of terrain	10,000 lbs.
Level Cross-country	1,400 miles at speeds applicable to conditions of terrain	10,000 lbs.
Hilly Cross-country	1,400 miles at speeds applicable to conditions of terrain	10,000 lbs.
Belgian Block	200 miles at speeds applicable to conditions of terrain	10,000 lbs.

TABLE IX		
10,000 mile test for LMTV trailers		
Course	Distance and Speeds	Payload
Hard-surfaced roads	2,000 miles at varying speeds up to maximum	5,000 lbs.
Secondary roads	5,000 miles at speeds applicable to conditions of terrain	5,000 lbs.
Level Cross-country	1,400 miles at speeds applicable to conditions of terrain	5,000 lbs.
Hilly Cross-country	1,400 miles at speeds applicable to conditions of terrain	5,000 lbs.
Belgian Block	200 miles at speeds applicable to conditions of terrain	5,000 lbs.

4.4. Quality Conformance Inspection:

4.4.1. One Hundred Percent (100%) Final Inspection. Each vehicle produced shall be subjected to a complete final inspection by the contractor, as described in this paragraph and in para 4.4.1.1 and 4.4.1.2, utilizing a Government approved Final Inspection Record (FIR). Verification and inspection of torque, dimensions, routings of hoses and electrical harnesses, and characteristics that are masked by subsequent assembly operations shall be accomplished during in-process assembly and inspection operation. In-process defect prevention techniques shall be implemented to the maximum extent possible to prevent the occurrence of defects during FIR activities. A complete copy of the in-process inspection records and FIR shall be submitted to the Government with each vehicle offered for acceptance. The contractor is required to perform a verification inspection of the items identified in Table II. The type of inspection is dependent on the paragraph referenced. It may be functional, operational, or visual. It is not intended to be a control test. Each vehicle shall be inspected by the contractor for the characteristics/defects listed in Table X and the FIR, as a minimum. If a characteristic is found defective the contractor is responsible to provide corrective action, and perform re-inspection prior to offering the vehicle to the Government for final acceptance.

4.4.1.1. Roller Test. The vehicle shall be operated on the roller type fixture for a minimum 3 miles and checked for proper operation of transmission selections of first through fifth gear in all-wheel drive mode only. All transmission selections shall be demonstrated during the track test defined below. The vehicle shall be run from 0 through maximum governed speed. The vehicle shall be checked for reverse operation. Before, during and after, all vehicle equipped instrumentation shall be monitored for proper operations and readings. The vehicle shall be stopped and engine idled for not less than 2 minutes after vehicle roller run. While idling, the vehicle shall be subjected to a walk-around inspection. Transmission, engine oil, radiator fluid (if equipped), power steering fluid, and hydraulic brake fluid (if equipped) levels shall be checked and adjusted if necessary before track test.

4.4.1.2. Track/Route (T/R) Test. Subsequent to examinations and corrections of deficiencies found during Roller Test (para 4.4.1.1), the vehicle shall be operated for a minimum of 12 miles on a relatively level, hard surfaced test T/R. The test T/R shall be capable of allowing the test vehicles to operate at a minimum of 50 mph. During the T/R test, the contractor shall verify that the vehicle successfully shifts through all forward transmission shift points. The T/R test shall also include speeds up to maximum governed speed. As an option, operation at maximum governed speed may be performed and demonstrated during the roller test. The vehicle shall be operated to verify that the transmission transfer case operates properly. The vehicle shall also be driven in reverse for a distance of not less than 50 feet. At the completion of accumulated miles, the vehicle shall be stopped and the engine allowed to idle for not less than 5 minutes. At this time a walk-around inspection shall be performed.

4.4.1.3. Examination or Test Failure. If any vehicle fails to pass any examinations or tests specified herein, the Government shall withhold acceptance until the contractor provides evidence that corrective action has been or is being taken.

4.4.2. Final Inspection of Production Vehicle by Sampling. The contractor shall not final inspect vehicles on a sampling basis in lieu of final inspection of each end item as described in 4.4.1 unless written authorization is received from the Government procuring activity.

4.4.2.1. Unclassified Defects. All defects that have no effect on function, safety, interchangeability, or life, but that are considered departures from good workmanship, will be noted in writing. Workmanship deficiencies falling within this category, and recurring in five consecutive lots, will be added to the minor defects classification list.

4.4.2.2. Recurring Major Deficiencies. A major deficiency (para 6.3.15.3) is recurring when the same defect occurs more than once in the same sample, or when the defect occurs in two successive samples. A major defect may be considered recurring when the historical inspection records ("P" chart or Government approved equivalent) reflect such a condition. Recurring major deficiencies shall be cause for the entire lot, or lots, to be

inspected for the recurring deficiencies. The deficiencies shall be corrected by the contractor prior to acceptance by the Government.

4.4.2.3. Recurring Minor Deficiencies. A minor deficiency (para 6.3.15.3) is recurring if it occurs in four successive samples. Recurring minor deficiencies shall be cause for the entire lot or lots to be inspected for the recurring deficiencies, and correction shall be accomplished prior to acceptance by the Government.

4.4.2.4. Sampling Inspection Failures. If any vehicle fails to pass any examination or test, the Government shall withhold acceptance of all vehicles in the lot, until the contractor provides evidence that corrective action has been taken to correct such deficiencies and the conditions that caused the deficiencies. On the failure of a lot to pass sampling inspection, the contractor shall revert to inspection, as defined in 4.4.1, until evidence the Government deems satisfactory has been provided by the contractor.

TABLE X
CLASSIFICATION OF DEFECTS

Defect No.	Defect Characteristic	Method of Inspection
	MAJOR	
101	Steering mechanism: malfunction, unusual noise, leak	Visual, functional
102	Engine: malfunction, unusual noise, leaks, improper installation, low oil level.	Visual, functional
103	Transmission: malfunction, unusual noise, improper shifting, leak.	Visual, functional
104	Drivetrain: malfunction, misalignment, unusual noise	Visual, functional
105	Transfer case assembly: malfunction, improper clearance, leaks, improper installation	Visual, functional
106	Cooling system and components: malfunction, unusual noise, leaks, improper installation	Visual, functional
107	Governor linkage and engine governor: malfunction, improper adjustment, inadequate clearance	Visual, functional
108	Electrical system and components: malfunction, improper voltage	Visual, functional
109	Service, parking brakes: malfunction, unusual noise, pulling to one-side, leaks	Visual, functional
110	Tires: damage, not properly inflated	Visual, gage
111	Lubrication system components (engine): damage, leakage, improper lubrication, cleanliness	Visual, functional
112	Fuel tanks and system: welding defects, leakage, cleanliness	Visual, functional
113	Exhaust system: damage, leaks, excessive noise, improper installation	Visual, functional
114	Suspension system: malfunction	Visual, functional
115	Winch and wire rope: malfunction, improper size, damage	Visual, functional
116	Instrumentation switches: malfunction, location, damage	Visual, functional
117	Nuclear, biological, chemical: storage mounting provisions	Visual

118	Weld defects: improper welds	Visual
119	Fire extinguisher: system malfunction	Visual
120	Personnel heater/climate control: malfunction, improper installation	Visual, functional
121	Crane/MHE components: malfunction, leaks, contamination	Visual, functional
122	Wrecker components: malfunction, leak, contamination	Visual, functional

MINOR

201	Coolant: low or improper mixture.	Visual, hydrometer
202	Lubricants: levels and proper types	Visual
203	Controls: malfunction, adjustments, damage.	Visual, functional
204	Wheels and tires: improper size, type and mounting.	Visual
205	Pulleys and fans: misalignment, improper clearance.	Visual
206	Bolts: defective, loose.	Visual, torque wrench
207	Wiring or tubing: defective, improper assembly or installation, improper protection, improper identification.	Visual
208	Body, doors, access covers, tiedowns, lifting device: improper fit, defective weldment, inadequate seals.	Visual, functional
209	Paint: application, improper color, camouflage pattern, coverage, corrosion	Visual
210	Lube fittings: defective, missing, improperly installed.	Visual
211	Cushions, seats: improper fit, tears, dry rot.	Visual
212	Decals, marking, data and instruction plates: incomplete data, missing, improper location or size.	Visual
213	Batteries: malfunction, cracks, improper installation.	Visual, functional
214	Radio Brackets/Connectors: improper installation.	Visual
215	Lights: improper installation, cracked lenses, malfunction.	Visual, functional
216	Air compressor/pneumatics: improper installation, malfunction, insufficient hose, low pressure, and leaks.	Visual, functional
217	Windows: cracked glass, improper installation, leaks	Visual, functional
218	Air Transportability: malfunction, leaks-hydraulic/pneumatics, fluid level, improper installation	Visual, functional
219	Central Tire Inflation System (CTIS): malfunction, leaks, improper installation.	Visual, functional
220	Windshield Washers: inoperative, fluid quantity, fluid level	Visual, functional
221	All other components/characteristics, as required	Visual, functional

4.5. Control Tests. Control tests for maintaining control of manufacturing operations shall be conducted by the manufacturer as specified below.

4.5.1. Frequency. The Government shall select one vehicle at random for control test from each two (2) week's production quantity.

4.5.2. 50 mile test. The test vehicles shall be fully equipped with either actual or simulated payload including the applicable fully loaded trailer and operated for a distance of not less than 50 miles on the relative level, hard-surfaced test track/route. Prior to conducting the control tests, the test vehicle shall be subjected to the road test without payload as depicted in 4.4.1.2. The control test shall be performed at the place of manufacture. Prior to conducting the 50-mile control test, each test vehicle shall be inspected to ascertain conformance to the requirements as referenced in Table II and X. These tests shall be performed in the presence of a Government representative. The control test shall validate the actual performance requirements listed in Table II.

4.5.3. Test Failure. If the vehicle selected fails to pass any of the control tests, the Government PCO shall stop acceptance examination and testing on subsequent vehicles until such time as conditions causing the failure have been remedied. Any defects found during, or as a result of the test, shall be prima facie evidence that vehicles accepted subsequent to the previously acceptable control tests were similarly defective, until the Procuring Contracting Officer is furnished evidence by the contractor that they are not similarly deficient. Such defects on all vehicles shall be corrected by the contractor at no cost to the Government. Another vehicle with corrective actions implemented shall be subjected to the control test to verify effectiveness of corrective actions.

4.6. Test (FPT). To determine conformance to Section 3, the Government may select samples as specified in the contract for Follow-on Production tests. Vehicle(s) shall be subjected to all Follow-on Production tests specified in Table II, examined as specified in 4.4.1, and tested for 10,000 miles in accordance with the course mileage ratios shown in tables for PVT. Tests shall be conducted to reveal defects of workmanship or material that may reduce the effective operation of these items in the field, and compare existing quality with previous standards. All tests specified shall be conducted at Government laboratories or test sites designated by the Government. Follow-on Production test vehicles selected shall not include any vehicles previously control tested. The Government may elect to conduct Follow-on tests of less than 10,000 miles.

4.6.1. Test Deficiencies. Follow-on Production test vehicle deficiencies during, or as a result of the Follow-on Production Test, may be cause for rejection of subsequent produced vehicles, until the contractor has provided evidence that corrective action has been taken to eliminate the deficiency. Any deficiency found during, or as a result of the Follow-on Test, shall be prima facie evidence that all vehicles currently or subsequently produced are similarly deficient, unless evidence satisfactory to the contracting officer is furnished by the contractor that they are not similarly deficient. The contractor shall correct such deficiencies on all vehicles at no cost to the Government.

4.7. Method of Examination and Test. The examinations and tests described herein are the minimum required to determine conformance to the requirements delineated in Section 3 of this specification. Additional examinations and tests by the contractor may be required to determine conformance to specification requirements. The Government reserves the authority to conduct the inspections/tests described in paragraph 4.7 (inclusive), and additional inspections/tests at the discretion of the Government to determine conformance of end items or components to specification requirements. Unless otherwise specified, all inspections shall be performed with vehicle(s) at maximum GVW.

4.7.1. Grade and Slope Test. To determine conformance to the grade and slope requirements contained in para 3.2.1.1 and 3.2.1.2, the vehicle shall be loaded to GVW and GCW and shall operate on the slopes specified. During operation on slopes, the vehicle shall be checked for evidence of stalling, slipping, overheating and upsetting. During specified slope operations, the vehicle engine shall be shut off and restarted a minimum of two times in each direction (forward, backward and both sides), with a minimum of one minute during shutdowns. Oil

pressure and equalization of fuel tanks (if more than one tank) shall be monitored. The vehicle shall be checked during and after testing for leakage of fuel, coolant and lubricants. During slope operations, the vehicle shall be monitored for loss of fuel supply to the engine. The torque converter (if provided) shall be tested for the specified requirements. The 30% side slope operation shall be performed with uniformly distributed cargo center of gravity 24 inches above cargo bed floor, either side of the vehicle facing up slope, while maintaining stability, without causing malfunction or subsequent loss of mobility.

4.7.2. Steering and Handling Test. To determine conformance to the steering and handling requirements contained in 3.2.1.3, the vehicle shall be loaded to GVW and tested IAW TOP 2-2-609. The vehicle shall be checked during and after testing for leakage of power steering fluid.

4.7.3. Speed Test. To determine conformance to 3.2.1.4, the vehicles shall be tested IAW TOP 2-2-602 paragraph 5.2.1 and TOP 2-2-610 paragraph 5.1.3.1 for achieving and maintaining the specified speeds with the specified weights on the specified grades. Test shall be conducted with the engine fan blocked on. If vehicle fails to achieve compliance with engine fan blocked on, a second test shall be conducted with the engine fan operating normally. Attainment of the minimum grade speeds listed in 3.2.1.4 during either test run shall demonstrate compliance with the requirement.

4.7.4. Turning Test. To determine conformance to 3.2.1.5, a LMTV and a MTV shall be tested for achieving the constant wall-to-wall radius of not more than 35 feet and 40 feet, respectively, in both directions with no adjustments of turning stops between directions. The vehicle, with stated towed items, shall demonstrate the ability to negotiate standard NATO 24 X 24 foot roads intersecting at 90°. The turning test shall be conducted with vehicle at GVW.

4.7.5. Vertical Step Test. To determine conformance to 3.2.1.6, a vehicle at GVW shall be tested IAW TOP 2-2-611 by climbing a 24 inch vertical step, both in forward and reverse gears, and descending the 24 inch step, in both forward and reverse gears. The vertical step shall be negotiated repeatedly without damage to any portion of the vehicle.

4.7.6. Fording Tests:

4.7.6.1. Fording Test. To determine conformance to 3.2.1.7, the vehicle shall be operated without preparation, in 30 inches of fresh or salt water, for at least 15 minutes. Fording for a period of 15 minutes shall not cause engine stall, degradation to vehicle components, need for maintenance actions, nor render the vehicle incapable of performing any operation of this specification. While fording, the engine shall be capable of being restarted when stopped for up to 10 minutes. Seals shall restrict the entrance of foreign matter into bearings, which are exposed to contamination during these operations. Water contamination of bearing lubricants shall not be more than 2.0% by volume. All bearing seals shall restrict the leaking of lubricants from the bearings. Immediately following the fording test, the wheel hubs shall be removed and examined for water or water born contamination. Fluid samples shall be taken from the engine, brake fluid, transmission, transfer transmission, power steering pump, fuel tank(s) and all differentials. Water contamination in excess of 2% by volume from before test samples shall be cause for rejection.

4.7.7. Range Test. To determine conformance to 3.2.1.8, the vehicle with rated payload and towed load shall be operated under the conditions specified. The vehicle shall use a fuel selected from the list in paragraph 3.4.1.9.

4.7.8. Noise Test. To determine conformance to 3.2.1.9, the vehicle shall be tested for the noise requirements specified. Exterior noise test procedures shall be in accordance with SAE J366, except vehicle payload shall be 2/3 rated payload and engine exhaust brake shall not be engaged during test. Interior noise test procedures shall be in accordance with SAE J336, except:

a. measurements shall be taken at the driver's and each passenger's position,

b. cab ventilation fan shall be in operation at its highest speed during testing, and

c. vehicle payload shall be 2/3 rated payload.

4.7.9. Emission Certification. To determine conformance to 3.2.1.10, the contractor shall certify that the vehicle (all variants) comply with the Environmental Protection Agency (EPA) Regulations governing control for Air Pollution from New Motor Vehicles and New Motor Vehicle Engines in effect on the date of sale of the vehicle. Certification shall be provided prior to FPVI, in accordance with 4.1.4

4.7.10. Brake Check/Certification. To determine conformance to 3.2.1.11, the vehicle brake system shall be checked for proper location, assembly and configuration of dual brake system. Prior to FPVI (para 4.3.1), the contractor shall certify that the brake linings are constructed from non-asbestos materials and the vehicle is in accordance with FMVSS 121.

4.7.10.1. Service Brake Test. To determine conformance to 3.2.1.11.1, service brakes shall be tested for the ability to control and hold the vehicle at GVW, on the maximum specified grade in ascending and descending position. Service brakes shall stop the vehicle as specified in paragraph 3.2.1.11.1 of the performance specification. Tests shall be conducted on a dry, hard, approximately level, road surface that is free from loose material. The results of a minimum of three consecutive stopping distances shall be averaged to determine adherence to stopping requirements. During braking tests, the vehicle shall be monitored for excessive pulling to the left or right. Brake light activation and brake light override or emergency shall be checked. During Production Verification Tests (para 4.3.2), and Follow-on Production Tests (4.6) the vehicle shall be tested according to TOP 2-2-608 for conformance to the test criteria specified therein. Each cross country cycle of the High Temperature Endurance test (TOP 2-2-608 para. 6.2.3.2) shall be performed with no vehicle stops during the cycle for the purpose of cooling the brakes. All brake testing shall be conducted without the use of engine or transmission retarders.

4.7.10.2. Parking Brake Test. To determine conformance to 3.2.1.11.2, a vehicle shall be tested on the specified slope, in both an upgrade and downgrade position, with the parking brakes set. The engine shall be operated a minimum of two minutes, and a minimum of one minute with the engine shutdown, in each test position (upgrade and downgrade). There shall be no evidence of side slipping during the test. The test shall be conducted on a dry, hard surface slope that is free from loose material. In addition, the proper parking brake application shall be demonstrated (i.e. spring action, or other energy). During testing, the parking brake light shall be checked for presence and proper operation, as specified.

4.7.10.3. Emergency Brake Test/Certification. To determine conformance to 3.2.1.11.3, the vehicle emergency brake system shall be tested for the specified requirements. The contractor shall certify to FMVSS 121 for stopping distances.

4.7.10.4. Glad Hands Check. To determine conformance to 3.2.1.11.4, the glad hands shall be checked for presence, location, function and marking and shall not leak. Glad hands, when hooked up to the towed vehicle's brake air supply shall function the towed vehicle's brake system.

4.7.11. Survivability. To determine conformance to 3.2.1.12, the vehicle shall be examined before, during and after test to verify absence of undue damage resulting from normal operation.

4.7.11.1. Electromagnetic Emission/Interference Test. To determine conformance to 3.2.1.12.1, the vehicle and components shall be subjected to tests IAW MIL-STD-461E.

4.7.11.2. High Altitude Electromagnetic Pulse (HAEMP). To determine conformance to 3.2.1.12.2, the vehicle electrical system component's protection against HAEMP shall be subjected to test levels of MIL-STD-2169.

4.7.11.3. Blackout Condition Lighting Test/Certification. To determine conformance to 3.2.1.12.3, vehicle blackout lighting shall be subjected to tests to validate the stated requirements.

4.7.12. Mobility Test. The MTV Cargo with MHE and the LMTV Cargo will be modeled to determine compliance to 3.2.1.13.

4.7.12.1. Cone Index Test. The MTV Cargo with MHE and the LMTV Cargo will be tested to determine 3.2.1.13.1 conformance.

4.7.13. RESERVED.

4.7.14. Ride Quality Test. The MTV Cargo with MHE and the LMTV Cargo will be tested at Waterways Experiment Station (WES) to determine 3.2.1.14 conformance.

4.7.15. Approach and Departure Angles Check. To determine conformance to 3.2.1.15, the angles of approach and departure, as defined in SAE J1100, shall be measured for the specified requirement.

4.7.16. Ground Clearance Test. To determine conformance to 3.2.1.16, a vehicle shall be measured for the specified requirements.

4.7.17. Towing. To determine conformance to 3.2.1.17, a vehicle shall be tested for the ability to (a) tow another like vehicle, (b) be towed by another like vehicle, and (c) be lift towed.

4.7.18. Dimensions Check. To determine conformance to 3.2.2.1, the width, height, and length of the vehicle shall be measured for the specified requirements. All dimensions shall be measured in accordance with the procedures contained in SAE J1100, Section 6, (Exterior Dimensions), except for paragraph W103, which is defined in paragraph 3.2.2.1.

4.7.19. Vehicle Loading (Payload). LMTV and MTV shall be tested during PVT to determine conformance to 3.2.2.2.

4.7.20. Painting Check. To determine conformance with 3.2.2.3.1, the vehicle shall be checked for proper application of paint in accordance with drawing 12420325. After application of the final coat of paint, the surface shall be checked for smoothness and shall be free of grit, seeds, streaks, runs, sags, wrinkles, pinholes, craters, and nonconformity of specified colors. In addition, the vehicle shall be checked for the required three-color camouflage pattern IAW the variant specific camouflage drawing. During production, the contractor shall have documented methods and instructions for In-Process Inspection, to verify cleaning, pre-treating, primer application, and top coat application procedures that conform to the referenced drawing requirements.

4.7.21. Corrosion Control Verification. To determine conformance to para 3.2.2.3 (inclusive) the vehicle corrosion prevention design will be evaluated by conducting a destructive Government-approved accelerated corrosion durability track test at an approved Government test site.

4.7.22. Dissimilar Metals. To determine conformance to 3.2.2.3.5 a visual inspection shall be performed.

4.7.23. Non-Skid Surface Check. To determine conformance to 3.2.2.3.6, vehicle areas such as walkways, working areas, or steps shall be checked for non-skid surfaces. Where non-skid coatings are applied, the application shall be checked coating IAW drawing 12420325.

4.7.24. Reliability Conformance. A reliability verification of the vehicle(s) test performance shall be conducted during PVT to verify that the Mean Miles Between Hardware Mission Failure (MMBHMF) requirements, for all body types as specified in 3.2.3 and shown in Table I, has been attained, utilizing generated test data (i.e., Test Incident Reports). The reliability requirements shall be verified at a point estimate. The point estimate is computed by dividing the total cumulative test miles (of designated test vehicles) by the total number of associated mission failures.

4.7.24.1. The LMTV Material Handling Equipment (MHE) shall be tested as follows: Eight (8) craning cycles shall be performed after Pre Mission Checks and Service, and prior to starting durability mileage each day. Eight (8) craning cycles shall be performed during and after operations inspection, and a final eight (8) craning cycles prior to the Post Mission Checks and Services. The LMTV MHE shall perform a total of 24 craning cycles per day, not to exceed 1,800 cycles of total testing per LMTV crane.

4.7.24.2. The MTV Material Handling Equipment (MHE) shall be tested as follows: Eight (8) craning cycles with a 4,500 lb. load at the truck side shall be performed after the Pre Mission Checks and Services, and prior to starting durability mileage each day. Eight (8) craning with a 2,500 lb. load at a 14 foot extension shall be performed during and after operations inspection, and eight (8) craning cycles prior to the Post Mission Checks and Services. The MTV MHE shall perform a total of 24 craning cycles per day, not to exceed 2,800 cycles of total testing per MTV crane.

4.7.25. Maintainability Verification. To determine conformance to para 3.2.4, a Maintenance Ratio (MR) of less than, or equal to, that specified in paragraph 3.2.4, must be demonstrated during PVT. The MR will be calculated using the total cumulative maintenance man-hours, scheduled and unscheduled, divided by the miles. Maintenance induced errors, crew errors and operator/crew inspection times are to be excluded.

4.7.26. Engine and Powertrain Durability Verification. To determine conformance to paragraph 3.2.5, the durability requirements shall be verified during Production Verification Test at 50% confidence (Binomial Distribution). A durability failure is defined as any incident that is chargeable to the hardware that results in either: a) replacement of the engine, transmission, transfer, differential assembly, or axle; or b) repair or corrective action required by a malfunction of the engine, transmission, transfer, differential assembly, axle (including geared hubs) or frame, which exceeds the capabilities of the unit and intermediate forward maintenance levels, as defined in the approved Maintenance Allocation Chart (MAC).

4.7.27. Engine Accessibility Verification. To determine conformance to 3.2.5.1, a test shall be conducted at a Government test site during Production Verification Testing.

4.7.28. Army Oil Analysis Program (AOAP) Check. To determine conformance to 3.2.5.2, the vehicle's oil sampling valves shall be examined in the engine, transmission and hydraulic system. The sampling valves should be checked for proper operation, location, assembly, leakage, and markings.

4.7.29. Chemical Agent Equipment Check. To determine conformance to 3.2.6, the vehicle shall be examined for the dedicated space and capacity to mount the specified equipment. Chemical Agent Environmental equipment, stowage brackets, space and hardware shall be examined for adequate location, assembly, electrical connections, restraints, and overall workmanship.

4.7.30. Environmental Tests. To determine conformance to 3.2.7, the vehicle shall be tested at the stated temperature ranges for a period of not less than 24 hours per range specified. The 120° F temperature testing shall include Southwest Asia solar loading. In Arctic environment with arctic kits installed IAW M.1.1 of Annex M, the vehicle shall be tested in accordance with para M.4.1. During testing, the vehicle shall be started and operated at least until the vehicle can be safely shut down IAW the TM without external power sources. As a minimum, the following equipment shall be operated to determine proper operation:

Engine, Transmission and Drivetrain Components (inclusive)
Winch
Electrical, including Lights (see 3.4.14)
Cooling System (see 3.4.1.3)
Instruments/Controls (see 3.4.10)
Personnel Heater and Climate Control (see 3.4.9)

4.7.31. Transportability Check/Examination. To determine conformance to 3.2.8, the vehicle shall be tested for the specified transportability requirements set forth in MIL-STD-209H, MIL-HDBK-1791 and MIL-STD-1366. The vehicle shall be checked for adequacy of tiedowns, lifting eyes, instructions for component removal when required for transport. The testing will be conducted to determine transportability by highway, rail, marine, and air modes.

4.7.31.1. Transportability Verification. To determine conformance to 3.2.8, a vehicle shall be prepared for shipment to verify the times required.

4.7.31.2. Medium Lift Helicopter Test. To determine conformance to 3.2.8.1, the MTV standard cargo without MHE at curb weight less kits and LMTV Cargo Truck at GVW with payload reduced as necessary shall be lifted and carried by CH-47D and CH-53E helicopters as specified. Prior to helicopter lift, the vehicle's slinging eyes shall be checked for proper installation and location. After testing, the vehicle shall be examined to assure that no damage is caused by testing.

4.7.31.3. Cargo Aircraft Test. To determine conformance to 3.2.8.2, a vehicle shall be loaded in a C-141, and C-130 aircraft. Vehicle loading shall be conducted in accordance with the requirements and preparation times specified. The vehicle shall be checked for meeting the requirements of MIL-HDBK-1791 with the exception of the cargo clearance distance from the ceiling changing from 6 inches to 2.5 inches resulting in a maximum cargo height from 102 inches to 105.5 inches.

4.7.31.4. Airdrop Test. To determine conformance to 3.2.8.3, the vehicle shall be tested by the Government. The test is considered a failure if the vehicle is not operable and completing the mission after the test.

4.7.31.5. Rail Impact Test. To determine the conformance to 3.2.8.4, the vehicle(s) shall be subjected to military standard rail impact test in accordance with MIL-STD-810. Prior to the rail impact test, the vehicle shall have been tested to the performance requirements specified in this specification. The vehicle shall be inspected before, during and after the rail impact test to check for spillage of lubricants, structural damage, and electrical shorts. Performance degradation is considered a deficiency.

4.7.31.6. Lifting and Tiedown Provisions Check/Certification. To determine conformance to 3.2.8.5, the contractor shall certify that tiedowns and lifting eyes meet the General Requirements (para 4) and Detailed Requirements (para 5) of MIL-STD-209H. During Government testing, all lifting and tiedown provisions shall be tested to insure the provisions, including the connecting structural members, meet the requirements of MIL-STD-209H, MIL-STD-814B, and MIL-STD-1791.

4.7.32. Cab Check. To determine conformance to 3.2.9, the vehicle shall be checked for three crewmember seating provisions when radios/radio mounts are not installed, and for two crewmember seating provisions when radios/radio mounts are installed.

4.7.32.1. Water Resistance. To determine conformance to 3.2.9.1, Water testing shall comply with MIL-STD-810F, Method 506.4, para 4.4.3, Procedure II - Watertightness except the test duration time shall be for 15 minutes.

4.7.32.2. Vibration Resistance. The cab structure assembly shall take a 200-hour Government approved hydropulse test to determine conformance to 3.2.9.2. Failure is determined to occur if more than 5% of any of these fail the test: cab structure joining mechanisms (linear weld, spot welds, bonds of any kind), installed mechanisms or devices. Operation and secure assembly and mounting of all devices and mechanisms, and suitability of all joints shall be determined before and after the test, and noted.

4.7.33. Material Check. To determine conformance to 3.3.1, the Government, during the course of the contract, shall review contractor's purchase orders, materials, and certifications to determine if the material specifications and quality conform to the specified standard publications.

4.7.33.1. Component Ratings and Specifications Check. To determine the conformance to 3.3.1.1, the prime contractor shall provide certified system component ratings and design applications on all components to be incorporated into the vehicle in accordance with the solicitation or contract.

4.7.33.2. Flammability of Interior Material Certification. To determine conformance to 3.3.1.2, the contractor shall provide the Government with certification(s) and test results that the vehicle interior material conforms to the flammability requirements of FMVSS 302.

4.7.33.3. Material Durability Certification. To determine conformance to 3.3.1.3, the contractor shall provide the government with certification(s) and test results that the non-metal components meet the specified requirements.

4.7.34. Nameplate or Marking Check. To determine conformance to 3.3.2, the vehicle shall be checked to ensure that exterior markings are applied in accordance with drawing no. 12422123 for nameplates (12420690 for air transport), 12422122 for stencils, as denoted in the TDP for body peculiar stencils or nameplates. All stowed items on the vehicle shall be checked for proper identification. To determine conformance to ID plate requirements, the vehicle shall be checked to ensure that the identification plate meets the requirements of A-A-50271 and 3.3.2. The ID plate shall be checked for specified attachment hardware and legibility. All markings shall be checked for adhesion, legibility, paint runs and location.

4.7.34.1. Vehicle Weight Classification Sign Kit Check. To determine conformance to 3.3.2.1, the vehicle sign kit shall be in accordance with MIL-S-40626.

4.7.35. Workmanship Check. To determine conformance to 3.3.3, complete vehicle and components shall be checked for quality of workmanship. Each vehicle shall have no evidence of cracks, dents, scratches, burrs, sharp edges, chaffing, loose parts, foreign matter, or any other evidence of poor workmanship. Each vehicle shall be checked to insure that normal vehicle operation does not cause chafing, binding or other damage to any harness, hose, control cable, lanyard, tube or line, that shall render the vehicle unsuitable/unsafe for the purpose intended.

4.7.35.1. Welding Inspection. To determine conformance to 3.3.3.1 all welds shall be visually inspected IAW Section #6 of AWS D1.1 for steel, AWS D1.2 for aluminum. For the purpose of this contract, weld quality and workmanship shall be verified by qualified inspectors trained to perform the specific functions they are assigned. Acceptable training may be based on a) current or previous certification as an AWS Certified Welding Inspector, b) current or previous verification by the Canadian Welding Bureau (CWB) or c) an Engineer or technician by formal

training or experience, or both, in metals fabrication, inspection and testing, who is competent in the use of weld inspection techniques and equipment. Welds will be checked, at a minimum, prior to and at the completion of testing.

4.7.36. Safety Checks. To determine conformance to 3.3.4, vehicle systems and components shall be checked for safety related hazards. Vehicle shall be checked for compliance with applicable safety standards in MIL-STD-1180 for Type I vehicles. (TOP 2.2-508 used as guide). Vehicle shall be checked for proper quantity and location of seat belts. The contractor shall supply certification that the seat belts and seat belt anchorages/installations are of the proper type and meet the applicable requirements of FMVSS 209 and FMVSS 210.

4.7.37. Human Engineering Checks. To determine conformance to 3.3.5, the vehicle shall be evaluated for soldier MOS requirements and standards specified. Conformance to service brake, parking brake, and ride quality requirements (paras 3.2.1.11.1, 3.2.1.11.2 and 3.2.1.14) shall be demonstrated using a government designated driver. During all Government testing, the vehicle will be evaluated for compliance with MIL-STD-1472.

4.7.37.1. Human Factors Check. To determine conformance to 3.3.5.1, the vehicle shall be evaluated for foot and hand holds for climbing into the cab, cargo bed, and mission equipment (FMTV variants) necessary for the operator and maintenance personnel to gain access to various locations on the vehicle.

4.7.38. Engine Examination/Certification. To determine conformance to 3.4.1, the engines shall be checked for malfunction/leaking of coolant, lubricants, and fuel. The engine shall be examined for completeness, proper installation in vehicle, electrical hookups, fuel and air line connections, mechanical control hookups, oil level, fuel consumption, and cooling fluid hookups. The contractor shall certify that the engine has passed the NATO 400-hour standard engine test, AEP-5, meets performance specifications, and the throttle return controls are in accordance with FMVSS 124. If the contractor and engine manufacturer certify the engine has passed commercial tests more strenuous than the NATO 400-hour standard engine test, the NATO 400-hour test certification will not be required, however a copy of the test procedure used to certify the engine will be provided with the certification. The engines shall be in accordance with SAE J1349 when tested. Engines shall demonstrate the ability to operate on alternate fuels specified in para 4.7.46.

4.7.39. Test Equipment Check/Test. To determine conformance to 3.4.1.1, the Built in Test Equipment (BITE) Diagnostic Connector Assembly shall be checked for proper installation. During control (para 4.5) and initial production tests (para 4.3.2), the connector assembly shall be tested in conjunction with a BITE unit to determine proper function and compatibility. The imbedded on-board sensors through the communication data bus will be verified for handling both the J1708 & J1939 protocols. Sufficient sizes and quantities of transducers shall be provided to support diagnosis of the vehicle.

4.7.40. Heavy-Duty Cooling System Test/Examination. To determine conformance to 3.4.1.2, the cooling system shall be tested to assure the vehicle meets cooling system requirements. The cooling system shall be tested for maintaining the specified component operating temperatures within the specified limits while operating continuously at full load and 0.6 tractive effort to gross vehicle weight ratio (TE/GVW) while under the maximum conditions of 120^{o} F for all variants with the exception of the Tractor and Wrecker which shall meet a minimum of 0.55 TE/GVW while under maximum conditions of 120^{o} F. Test shall be conducted IAW TOP 2-2-607 Change 1. During testing, the cooling system must not exceed temperature limits while operating at rated engine power. The cooling system shall be tested and must meet the above requirements after a drawdown of 10% of engine coolant. During cooling system testing, the capability of retention and recovery or expansion reserve capacity shall be checked to the specified requirements. The contractor shall certify that deaeration tests in accordance with SAE J1436 July 95 Information Report para 5.3 have been conducted with performance equal to or exceeding the requirement of 3.4.1.2. The air shall be injected near the pump outlet at the lowest point of the block. The radiator shall be inspected and must have no more than 4 fins per cm. Test reports and material certifications shall be made

available to the Government verifying radiator hoses are silicon type and meet the requirements of A-A-52426. The cooling system shall be checked periodically during testing at a Government proving ground for leakage (no leaks are allowed).

4.7.40.1. Engine Coolant Certification. To determine conformance to 3.4.1.3, the contractor shall certify that the engine coolant (if water cooled) meets the requirements of A-A-52624, and that the coolant consists of a 50/50 solution of ethylene glycol and water with rust inhibitor additives.

4.7.41. Engine Air Induction System Check. To determine conformance to 3.4.1.4, the hoses and lines shall be checked for proper position and contamination. System intakes shall be checked for proper installation to prevent entrance of foreign matter during normal vehicle operation, including fording. The air cleaner restriction gauge shall be checked for proper installation, function and requirement of visibility from the driver's compartment.

4.7.42. Air Cleaner Check/Certification. To determine conformance to 3.4.1.5, the air cleaner system shall be checked for proper installation and for proper configuration type (heavy-duty, dry-type). The contractor shall certify that the air cleaner element meets the 200 hour laboratory service life requirements when tested per MIL-PRF-62048.

4.7.43. Oil Filter Check/ Certification. The contractor shall provide certification that the oil filter complies with 3.4.1.6. Oil filter shall be checked for leaks.

4.7.44. Fuel System Check/Certification. To determine conformance to 3.4.1.7, the contractor shall certify that the fuel system conforms to the requirements of FMCSR, para 393, subpart E. The fuel system shall be checked for leakage, location of fuel lines, and incorporation of an in-line water separator in the fuel lines.

4.7.45. Fuel Tanks Check/Certification. The fuel tank(s) shall be checked to verify that only 95% filling capacity is allowed. During PVT and FPT the vehicle shall also be tested for proper operation with 10% (approximation) fuel remaining. During inspection(s) and testing, compliance with the requirements of 3.4.1.8 will be determined. The contractor shall certify that the fuel tanks are corrosion resistant and the safety venting system and pressure resistance meets FMCSR 393.67(F).

4.7.46. Fuels and Lubricants Certification/Check. To determine conformance to 3.4.1.9 (inclusive), the contractor shall certify that vehicle lubricants conform to the requirements of MIL-PRF-2104, MIL-PRF-2105, QPL-46167, QPL-10924, and QPL-23827, and as to vehicle operability with fuels specified below. The vehicle shall be checked for proper lubricant levels in accordance with the supplied lubrication chart, and operation of listed fuels. Vehicle performance will be evaluated with primary fuels and lubricants during testing.

Primary	Alternate	Emergency
A-A-52557 ASTM D1655 (JP8), F34	ASTM D1655 (DF1, DF2 & DFA) F54 MIL-DTL-5624T (JP5), F44 ASTM D975 Fuel Naval ASTM D3699 (Kerosene)) F45 Distillate, F76 ASTM D975	ASTM D396 (Fuel Oil, No. 1 & 2 Reference No. I & II)

(Fuel, MIL-DTL-5624T (JP4)), F40

4.7.46.1. Hydraulic System. To determine conformance to 3.4.1.9.3 the hydraulic tank and filtration system shall be checked for installation and function.

4.7.47. High-Coolant-Temperature Warning Test/Check. To determine conformance to 3.4.1.10, the vehicle shall be inspected and tested for location, function, and assembly of the high-coolant-temperature warning device.

4.7.48. Exhaust System Certification/Check. To determine conformance to 3.4.2, the contractor shall certify that the vehicle exhaust system conforms to the requirements of FMCSR 393.83. The vehicle shall be checked for proper installation of exhaust system components to preclude exhaust leaks and heat damage. In addition the vehicle shall be checked for stainless steel construction of exhaust mufflers and tail pipes. The contractor shall also certify that the design of mounting brackets and fasteners protects against dissimilar metal corrosion.

4.7.48.1. Toxic Gas Exposure Test. To determine conformance to 3.4.2.1 (inclusive), toxic gas levels shall be tested to assure that they do not exceed: carbon monoxide (CO) in excess of values which shall result in carboxyhemoglobin (COHb) levels in the blood greater than 10% in accordance with MIL-STD-1472. Percent COHb blood levels will be estimated using the guidelines published in MIL-HDBK-759A, using work stress level 4 for weapons firing and work stress level 3 for all other mission activities. Nitrogen dioxide, ammonia, nitric oxide and sulfur dioxide and any other harmful gasses generated shall be limited to concentrations not to exceed those specified in the Threshold Limit Values by the American Conference of Governmental Industrial Hygienists.

4.7.49. Power Train.

4.7.49.1. Transmission Check/Certification. To determine conformance to 3.4.3.1 (inclusive), the transmission shall be checked for proper type (automatic as defined in SAE J645) and smooth operation/shifting in all gears including reverse. During vehicle road tests, the transmission downshift inhibitor system or automatic system shall be checked for proper operation during each forward gear (para 4.4.1.2 (inclusive) and 4.5.2). The transmission shall be checked for proper installation, oil leaks, and excessive heat during vehicle operation. The contractor shall certify that the transmission conforms to FMVSS 102. During testing at a Government proving ground, all transmission control system requirements shall be tested or checked.

4.7.49.2. Inhibitor System Test. To determine conformance to 3.4.3.1.1, the vehicle shall be tested for inhibiting driver shifting action into reverse or for down shifting that overspeeds or damages engine, transmission or drive train components.

4.7.49.3. Transmission Filter Check. To determine conformance to 3.4.3.1.2, the government shall check the transmission for accessible transmission filter (if provided) and for the required heat exchanger air flow (if provided and recommended by the transmission manufacturer for the intended application).

4.7.49.4. Transmission Control System Check. Check the neutral interlock system to insure starter engages only in neutral.

4.7.49.5. RESERVED.

4.7.50. Transfer Case Check. The contractor shall certify compliance to 3.4.3.2 prior to presenting PVT vehicles to the Government. Contractor and Government testing shall assure compliance to 3.4.3.2 is maintained during vehicle production.

4.7.51. Differential Check. To determine conformance to 3.4.3.3 (inclusive), the differential shall be checked for proper installation, leaks and excessive heat during operation.

4.7.52. Frame Check. To determine conformance to 3.4.4, the vehicle frame shall be periodically checked during Government proving ground testing to detect any sign of overstress condition (cracks, weld breaks, misalignment, and damage to other components induced by the frame). The contractor shall certify the frame is of 110 ksi steel.

4.7.53. Suspension and Axle Check. To determine conformance to 3.4.5.1, the vehicle suspension and axles shall be checked for proper mounting clearance, lubrication and alignment. The vehicle suspension shall be periodically inspected during Government Proving Ground tests to detect any overstress condition.

4.7.54. Wheels, Rims, and Tires Check/Certification. To determine conformance to 3.4.5.2, the vehicle's wheels, rims, and tires shall be checked for proper type ratings specified. The tires shall be checked for condition, lug nut torque, proper tire pressure, location of tire pressure stencil markings and adequate clearance. Lug nuts shall be checked for commonality across all wheels of all variants, to include trailers. Operational requirements shall be demonstrated at Government proving ground. The contractor shall certify that the rim and tire ratings conform to FMVSS 119, 120, and SAE J2014.

4.7.55. Tire Tread Design Test. To determine conformance to 3.4.5.3, a vehicle shall be tested for the tire tread design requirement specified.

4.7.56. Shock Absorber Check. To determine the conformance to 3.4.5.4, the vehicle shock absorbers shall be checked for proper installation and assembly. After road tests, the shock absorber shall be checked for leakage or distortion.

4.7.57. Steering Lock Check. To determine conformance to 3.4.6, the steering wheel lock shall be checked to ensure its intended purpose can be accomplished with equipment specified.

4.7.58. Windshield Check/Certification. To determine conformance to 3.4.7 (inclusive), the windshield, windshield washer and wipers shall be checked for proper location, installation, assembly and operation of washer and wipers. Washer reservoir shall not leak when the cab is rotated over for maintenance. The contractor shall certify that the glazing is in accordance with FMVSS 205.

4.7.59. Bumpers and Towing Devices Check. To determine conformance to 3.4.8, the towing devices shall be inspected for compatibility with the standard Army Towbar 7551383. The vehicle shall be towed for a distance of not less than 10 mi. During and upon completion of towing operations, the vehicle shall be checked for damage. None is allowed. To determine conformance to para 3.4.8, the vehicle shall be checked after all towing operations of equipment specified for distortion, broken welds or other damage due to towing. Prior to First Production Vehicles Inspection (para 4.3.1), the contractor shall certify that the rear end protection conforms to FMCSR 393.86 as modified in paragraph 3.4.8, that towing devices conform to FMCSR 393.70, and that provisions for the attachment for trailer safety chains conform to SAE J849 (per truck installation note).

4.7.60. Heater and Defroster Test Check/Certification. To determine conformance to 3.4.9, the personnel heater and climatic control system (if installed) shall be tested during the environmental tests referenced in para 4.7.30. During inspections at contractor facilities (i.e., First Production Vehicle Inspection, para 4.3.1) the equipment shall be checked for motor operation, flow of hot/cold air, proper installation, condition and location of hoses. Prior to First Production Vehicle Inspection (para 4.3.1), the contractor shall certify that the windshield defrosting system conforms to MIL-STD-1180, requirement 103, Class 1, for -25^{o} F.

4.7.61. Controls and Operating Mechanisms Check/Certification. To determine conformance to 3.4.10, the vehicle control system and illumination shall be checked for compliance with specified standards. Prior to First

Production Vehicle Inspection, the contractor shall certify that the standard controls and mechanisms conform to FMVSS 101 as tailored in 3.4.10.

4.7.62. Accessories and Equipment Check. To determine conformance to 3.4.11, the chassis equipment not specified shall be checked for proper installation and function.

4.7.63. Rear View Mirrors Check. To determine conformance to 3.4.12, vehicle mirrors shall be checked for size and folding as specified.

4.7.64. Drain Plug Check. To determine conformance to 3.4.13, drain plugs shall be checked for magnetic type (MS equivalent) and for accessibility.

4.7.65. Electrical System Test/Check/Certification. To determine conformance to 3.4.14, the vehicle electrical system (24 volt, waterproof) during First Production Vehicle Inspection (para 4.3.1) and Control Tests (para 4.5) shall be tested in accordance to the test methods stated in paragraph 6.1 of MIL-STD-1275 in addition to other examinations/tests as required to insure adherence to MIL-STD-1275. The ripple (6.1a), spikes (6.1b) and surges (6.1c) tests specified in MIL-STD-1275 shall be conducted simultaneously with a cracking level test (para 5.1.3.5.2). Testing results shall meet the requirements stated in para 5, "Detailed Requirements" of MIL-STD-1275. During Quality Conformance Inspections (para 4.4), the vehicle shall be checked for location, protection, condition and numerical-coding of electrical wiring/harnesses. The contractor shall certify the vehicle electrically meets the requirements of FMCSR 393.27 through System 393.33.

4.7.66. Charging and Regulating System Check/Test.

4.7.66.1. Alternator Check/Test. To determine conformance to 3.4.14.1.1, the vehicle alternator shall be inspected and tested for conformance, as specified.

4.7.66.2. Regulating System Check Test. To determine conformance to 3.4.14.1.2, the vehicle regulating system characteristics (dual voltage control) shall be tested for proper charging (all conditions). During Quality Conformance Inspection (para 4.4) the system shall be inspected for assembly, installation, and operation.

4.7.67. Starter Check. To determine conformance to 3.4.14.2, the vehicle starter shall be tested for compliance with specified standards (A-A-59294). During Quality Conformance Inspection, starter re-engagement and restart requirements shall be tested, and starter shall be inspected to verify proper sealing/venting.

4.7.68. Lighting System Check/Certification. To determine conformance to 3.4.14.3, the vehicle lighting system shall be checked for proper operation, installation of the lights and equipment specified, in accordance with applicable referenced drawings. During the First Production Vehicle Inspection (para 4.3.1), the contractor shall certify compliance to FMVSS 108, except for the items exempted IAW 3.4.14.3.

4.7.69. Wiring Check. To determine conformance to 3.4.14.4, vehicle wiring shall be checked to specified standards and for minimum wire size.

4.7.70. Batteries Test/Check/Certification. To determine conformance to 3.4.14.5.1, 3.4.14.5.2, the contractor shall certify that the batteries conform to the physical/functional requirements cited in MS 52149-2. During the Quality Conformance Inspection (para 4.4), the batteries, carrier, cables, master electric power switch and external ignition control shall be checked for location, condition, proper installation and operation.

4.7.71. Horn Check. To determine conformance to 3.4.14.6, the vehicle horn shall be checked for proper operation and mounting.

4.7.72. Electrical Connector Check. To determine conformance to 3.4.14.7, vehicle shall be checked for installation and function of trailer connections. Slave receptacle shall be checked to 12342303. All connectors shall be examined for waterproof design specified. During tests at Government proving ground (see Table II), the vehicle shall be tested for jump start capability with the slave cable and an outside power source.

4.7.73. Instrument Check. To determine conformance to 3.4.14.8, vehicle instruments and gauges shall be checked for compliance with the requirements specified. Gauges shall include fuel level, coolant temperature, engine oil pressure, battery condition, speedometer/odometer, air pressure (air assist vehicle/trailer brakes). All other instruments shall be indicators (i.e. engine temperature, transmission temperature, brake warning, park brake on and filter minder (engine air induction filter). The speedometer shall be calibrated for both mph and kph. Vehicle warning lights shall include, as a minimum, low air pressure, engine temperature, front wheel drive indicator (if not full-time), headlight high beam, parking brake, and emergency brake engaged.

4.7.74. Audible Warnings Check. To determine conformance to 3.4.14.9, the audible warning system shall be checked to verify proper operation at low air pressure.

4.7.75. Ignition Switch Check. To determine conformance to 3.4.14.10, the vehicle ignition switch shall be tested to assure that no damage occurs to any radio/communication device or any other electrical/electronic accessory that draws power through the vehicle's power distribution system. Vehicle ignition switch shall be tested for transmission of sufficient power from the vehicle's batteries to the starter during ignition switch activation to start the vehicle under all climatic conditions.

4.7.76. Control Cables Check. To determine conformance to 3.4.15, control cables shall be checked for seal condition, freedom of movement and operation.

4.7.77. Wheel Splash and Stone Throw Check. To determine conformance to 3.4.16, vehicle fenders and inner splash shields shall be checked for specified chain clearance and for maximum practical protection of engine and under hood and under vehicle componentry from debris. Rear wheel splash and stone throw protection shall be checked for conformance to SAE J682.

4.7.78. Rifle Mount Check. To determine conformance to 3.4.17, the rifle mount racks shall be checked for proper location and capability to hold three M16A2/M4 rifles, with and without listed accessories.

4.7.79. Communication/Intelligence System Equipment Check. To determine conformance to 3.4.18, the specified equipment will be installed to assure power source and mounting are available for operation of the equipment.

4.7.80. Vehicle Winch. To determine conformance to para 3.4.19, the winch and cable shall be tested for the rated pull capability specified. After testing, the winch shall be examined for damage and the cable shall be checked for fraying. During Quality Conformance Inspection (para 4.4), the winch shall be checked for proper assembly, installation, length of cable (at least 85 meters), cable type (swage strand, no splice joint and clevis ends), and shall be tested by pulling an unloaded vehicle on hard level surface. All hydraulic pressure adjustments shall be inspected and recorded prior to vehicle shipment. The winch drum diameter shall be checked for diameter requirement specified. The winch shall be checked for the proper information specified on the winch nameplate in accordance with para 2.1 of SAE J706. The contractor shall certify that the winch meets the "General Specification" requirements contained in para 2 of SAE J706. In addition, the certification shall include adherence to the maximum continuous rating and the overload requirement specified. The certification including test results shall be provided with each vehicle having a winch. The certification shall address all requirements of para 3.4.19 to allow the user to immediately use the winch without additional testing upon fielding. The contractor shall assure that the winch cable is properly wound, free of corrosion, bird nesting, twist, kinks and other defects caused by an improperly spooled cable.

5. PREPARATION FOR DELIVERY

5.1. Vehicle Processing. Preserve and process vehicles in accordance with the Equipment Preservation Data Sheet for Shipment and Storage (EPDS) developed by the Contractor and approved by the Government prior to shipment.

5.2. Vehicle Storage. The Contractor shall develop processing instructions for storage and exercising directions of vehicles should they be shipped in place or conditionally accepted and be approved by the Government. Contractor shall assure that any extended storage shall not cause the produced vehicles to fail to meet the 22 year corrosion prevention design requirement as referenced in 3.2.2.3.3 and that normal washing and maintenance shall be in effect to assure that (a) contaminants do not build up on vehicles while in storage and (b) proper lubrication is maintained.

5.3. Prior to loading vehicles for sea or air shipments, vehicles shall contain 1/4 tank of fuel which contains Biobor JF Biocide (reference: MIL-S-53021) preservative or equivalent.

6. NOTES.

6.1. Intended Use. The intended use of this system is for operations throughout the theater as multipurpose transportation and unit mobility vehicles by combat, combat support and service support units.

6.2. Ordering Data. Procurement documents should specify the following:

a. Title, Number and Date of specification
b. Quantities of Initial Production Vehicles
c. Paint, if other than standard
d. Kits to be installed

Additional Requirements as addressed by Contracting Officer.

6.3. Definitions. For the purpose of this specification the following definitions shall apply.

6.3.1. Payload. The LMTV cargo truck and van shall be capable of transporting a minimum 2.5 tons cross-country/on-highway while meeting all performance requirements of section 3 of this specification. The MTV cargo truck shall transport a minimum payload of 5 tons under identical conditions. The vehicle payload shall include all kits, except troop seat kits for cargo vehicles, crew, crew gear and BII. The dump truck shall be capable of transporting loads with a volume of up to 5 cubic yards and weighing at least 10,000 lbs. The expansible van shall have a payload consistent with the payload capacity of the MTV chassis, but not less than 5,000 lbs. The tractor 5th wheel shall safely accept loads of up to 25,000 lbs. The LMTV Trailers (LMTVT) shall be capable of carrying and transporting a minimum 5000 lbs. payload. The MTV Trailers (MTVT) shall be capable of carrying and transporting a minimum 10,000 lbs. payload.

6.3.2. Vehicle Curb Weight (VCW). The VCW shall include the weight of the empty truck (or trailer), including integral MHE and winch (if applicable), full complement of fuel, lubricants, coolants, hydraulic fluid, troop seat kits (if applicable), crew, crew gear and BII.

6.3.3. Gross Vehicle Weight (GVW). The GVW is defined as the sum of the VCW and maximum payload. For performance requirements, para 3.2 and subparagraphs of 3.2, the GVW of the tractor and wrecker is equal to VCW.

6.3.4. Maximum Towed load. The maximum towed load shall be defined as follows:

6.3.4.1. LMTV Variants - Pulling the greater of the LMTVT at GVW or trailers towed by current 2 ½ ton tactical trucks, or 12,000 lbs.

6.3.4.2. MTV Variants except as shown below - Pulling the greater of the MTVT at GVW, an M198 Howitzer, trailers towed by current 5 ton tactical vehicles, or 21,000 lbs.

6.3.4.3. Tractor - Pulling a fully loaded M871 trailer.

6.3.4.4. Wrecker - Lifting and towing the MTV Cargo w/MHE model at GVW from the front for mobility requirements and the heaviest FMTV model at GVW from the front for performance requirements.

6.3.5. Gross Combination Weight (GCW). The GCW shall be defined as the sum of the GVW and the designated primary towed loads below:

a. MTV variants (except tractor and wrecker), the MTV cargo trailer,
b. MTV tractor, semi-trailer loads commonly towed by M939 series tractors, 60,000 lbs (Trailer plus payload) for endurance and mobility, fully loaded M871 for performance requirement.
c. MTV wrecker, as per para 6.3.4.4
d. LMTV variants, the LMTV cargo trailer

6.3.6. Vehicle Cone Index (VCI). The minimum soil strength in the critical soil layer in terms of RCI for fine grained soils, and CI for coarse grained soils, required for a specific number of passes of a vehicle. VCI_1 indicates only 1 (one) pass.

6.3.7. Remolding Index (RI). A ratio that expresses the proportion of original strength of a medium that will remain under a moving vehicle. The ratio is determined from CI measurements made before and after remolding a 6 inch long sample using special apparatus.

6.3.8. Rating Cone Index (RCI). The product of the measured CI and the RI of the same layer.

6.3.9. Cone Index (CI). An index of the shearing resistance of a medium at any depth by a penetrometer. The resistance to penetration by a 30° cone with a 0.5 square inch circular base is expressed in pounds of force on the handle per square inch of the base area. In the basic Waterways Experiment Station (WES) Vehicle Cone Index (VCI) system the CI is considered as an index only, and no direct meaning is assigned to its dimensions.

6.3.10. Slopes. Defined as a sharp transition from one constant grade to another constant grade, which is up to a specified percentage difference in any direction.

6.3.11. Tractive Effort. Tractive Effort is defined as the drawbar pull plus the rolling resistance.

6.3.12. Mission Statement. One mission shall consist of a maximum 175 miles of operation under the herein described load, speed, terrain and environment, with special functions described.

6.3.13. Terrain Conditions.

6.3.13.1. Primary Roads. There are three types of primary roads: high quality paved, secondary pavement, and rough pavement. All may consist of two or more lanes, all weather, maintained, hard surface (paved) roads with good driving visibility used for heavy and high density traffic. These roads have lanes with a minimum width of 108 inches, road crown to 2 degrees and the legal maximum GVW/GCW for the county and state is assured for all bridges. (a) High quality paved roads have surfaces having an average Root Mean Square (RMS) value of 0.1 inches. (b) Secondary pavement has an average RMS of 0.2 inches and can include significantly degraded concrete,

macadam concrete or asphalt pavements (potholes, alligator cracking, freeze/thaw breakup). (c) Rough pavement consists of two lane roads with degraded shoulders, and marginal subgrades that produce long wavelength swells and additional degradation of the surface. Rough pavements have an average RMS of 0.3 inches. (d) The wave number spectrum equation and average travel speed for the three levels of pavement roughness are as follows:

Surface	Wave Number Spectrum	Average Speed (mph/kph)
High Quality Paved Road	$G_{xx}(n) = 1.4 \times 10^{-8}(n)^{-2.5}$	55/88
Secondary Pavement (Two Lane Paved Road)	$G_{xx}(n) = 1.9 \times 10^{-7}(n)^{-2.5}$	50/80
Rough Pavement (Degraded Paved Road)	$G_{xx}(n) = 8.0 \times 10^{-7}(n)^{-2.5}$	42/72

6.3.13.2. Secondary Roads. There are three types of secondary roads: loose surface, loose surface with washboard and potholes, and Belgian block. These roads are one or more lanes, all weather, occasionally maintained, varying surface (e.g., large rock, crushed rock, gravel and soil aggregate) intended for medium-weight, low-density traffic. These roads have lanes with minimum width of 8 feet and no guarantee that the legal maximum GVW/GCW for the county and state is assured for all bridges. These roads are surfaces having a RMS value varying between 0.3 inches to 1.0 inches.

The wave number spectrum equation, percentages of total travel, and average travel speed for the three levels of pavement roughness are as follows:

Surface	Wave Number Spectrum	Percent of total "Secondary" miles	Average Speed (mph/kph)
Loose Surface	$G_{xx}(n) = 3.0 \times 10^{-5}(n)^{-2.0}$	40%	30/48
Loose Surface w/ Washboard and Potholes	$G_{xx}(n) = 4.0 \times 10^{-6}(n)^{-2.4}$	50%	30/48
Belgian Block	$G_{xx}(n) = 4.0 \times 10^{-4}(n)^{-1.4}$	10%	20/32

Loose surface with washboard roads have a peak amplitude of 5.0×10^{-3} ft^2/cycle/ft at 0.3 to 0.5 cycle ft (2 to 3-foot wavelengths). Loose surface roads with a high density of potholes have a peak amplitude of 9.0×10^{-3} ft^2/cycle/ft at 0.1 to 0.2 cycle/ft (5 to 10 foot wavelengths). Generally, washboard occurs in operational areas that are dry, whereas pothole gravel roads occur in wet operational areas.

Belgian Block secondary roads have a peak amplitude of 8.0×10^{-2} ft^2/cycle/ft at .083 cycle/ft (12 foot wavelengths) and these wavelengths are 180° out-of-phase left to right which produces a racking input to the vehicle. The cobblestone blocks dominate the amplitude of the wavelengths at 1 cycle/ft.

6.3.13.3. Trails. One lane, unimproved, seldom maintained loose surface roads, intended for low-density traffic. Trails have no defined road width and can include large obstacles (boulder, logs, and stumps) and no

bridging. These are surfaces having a RMS value varying between 1.0 inches and 3.4 inches. The wave-number spectrum equation for the trail roughness is as follows:

Surface	Wave Number Spectrum	Average Speed (mph/kph)
Trails	$G_{xx}(n) = 4.6 \times 10^{-4}(n)^{-1.9}$	20/32

6.3.13.4. Cross-Country. Vehicle operations over terrain not subject to repeated traffic. No roads, routes, well-worn trails, or man-made improvements exist. (This definition does not apply to vehicle test courses that are made to simulate cross-country terrain.) In addition, cross-country terrain can consist of tank trails with crushed rock or having large exposed obstacles (rocks, boulders, etc). These are surfaces having a RMS value varying between 1.5 inches and 4.8 inches. The wave-number spectrum equation for the cross-country roughness is as follows:

Surface	Wave Number Spectrum	Average Speed (mph/kph)
Cross-Country	$G_{xx}(n) = 9.2 \times 10^{-4}(n)^{-2.1}$	15/24

6.3.13.5. Road Left and Right Track Correlation. Fixed frequency, RMS, and half-round obstacles shall include roughness or events where the left and right wheel paths are shifted longitudinally up to ± 45 degrees (approximately 6 1/2-ft (2m)).

6.3.13.6. Roughness Tolerances. The random roughness' expressed through the straight-line wave number spectrum relationships are average values and actual road roughness will naturally contain variability. The upper and lower limits for the random portion of the road roughness have a ± 3 dB envelope.

6.3.14. Like Vehicle. "Like vehicle" (paragraph 3.2.1.17) is defined as:

a. For MTV: MTV Series, M939 Series and M809 Series 5-ton trucks.
b. For LMTV: LMTV Series and M35 Series 2-½-ton trucks.

6.3.15. Quality Assurance Terms and Definitions. Unless otherwise specified quality assurance terms used herein shall be as defined in ASQC-8204.

6.3.15.1. Process Average. Sampling may only be activated by the procuring activity, and then if the process average value for first twenty vehicles inspected than the A.Q.L. specified in the classification of defects for major and minor defects. Process average shall be computed as follows:

Process Average = (# defects/ # vehicles inspected) x 100.

6.3.15.2. Computed Process Average. If the computed process average exceeds the specified A.Q.L., 100 percent inspection shall be performed and continued until such time that the process average for twenty consecutive vehicles is less than the specified A.Q.L.

6.3.15.3. Definitions of Recurring Major and Minor Defects. The inspector shall verify that an inspection of each vehicle is performed by the contractor. The Government inspector shall assure that all deficiencies encountered during the inspection are enumerated on the deficiency sheet for the vehicle. The defects noted on the deficiency sheet shall contain sufficient description to allow the Government inspector and the contractor's

representative to classify the deficiency IAW the classification of defects of the vehicle specification and definitions contained in ANSI/ASQC Z1.4. Corrective action shall be taken for recurring deficiencies.

6.3.15.4. Fluid Leaks

6.3.15.4.1. Classification

a. a. Class I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
b. b. Class II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being inspected.
c. c. Class III - Leakage of fluid great enough to form drops that fall from the item being inspected.

6.3.15.4.2. Category of Defect

a. Class I - Minor Defect
b. Class II - Major Defect
c. Class III - Major Defect

6.3.16. Certification. The supplier and his component sub-suppliers shall certify that the chassis, components and materials conform to the requirements specified herein IAW MIL-STD-1180. A list of components to be certified is set forth in the solicitation. In addition components listed herein shall be tested, and pass the component verification tests specified herein.

Engine/ECU	Fan/Clutches	Radiators/Coolers
Transmission/ECU	Steering System	ABS/ECU Brake Systems
Axles/Differentials	Tires, Wheels	Suspension Systems
MHE	Prop Shafts & Yokes	Fifth Wheel
Transfer Case	PTOs	CTIS incl ECU
Winches	Wrecker Winch/Underride	Alternators
Dump Cylinder	Wrecker controls	Harnesses
Air Induction items	Fuel Tanks	Air Tanks/Dryer
Cab structure/Doors	Windows/Windshield	Heater/Defroster
Starters	Compressors	Pumps

6.3.17. Dimensions. Dimensions shall be defined in accordance with SAE J1100 except for para W103, vehicle width, which is redefined as: the maximum dimension measured between the widest points on the vehicle, excluding exterior mirrors and marker lamps, but including bumpers, moldings, and sheet metal protrusions. The vehicle dimensions for worldwide operation and transportability shall not exceed the following:

Width - 96 inches

Length- The length of all models shall not exceed 394 inches

Height- As required to meet aircraft maximum cargo height from 102 inches to 105.5 inches

Height- As required to meet airdrop requirements

Height- As required to meet road march conditions, 12 feet

6.3.18. Dressed Engine. A dressed assembly shall consist of the assembly and all components, brackets, hang-ons and attaching hardware (i.e., air compressor, starter, turbocharger, pulleys etc.) that is common to all vehicle variants (within a family or series of vehicles).

6.3.19. Mission Essential Functions. These mission essential functions apply to both light and medium class vehicles to include the MTV Cargo, MTV Tractor, MTV Dump, MTV Shelters/Vans, MTV Wrecker, MTV Trailer, LMTV Cargo, LMTV Shelter/Van, and LMTV Trailer. An incident which would result in the inability to safely perform any one of these mission essential functions to a level no less than that described below will be charged as an operational mission failure.

6.3.19.1. Mobility. All FMTV variants must be able to safely begin, continue, and complete assigned missions in all weather conditions and all terrain types as specified in the OMS/MP. The capabilities required to complete these missions will not be degraded below those minimums stated in the JSOR.

6.3.19.2. MTV/LMTV Cargo Variants (with and without materiel handling equipment). Cargo Handling Function. The MTV/LMTV cargo variants must be able to have cargo safely loaded, secured, and unloaded up to the full rate capacity of the vehicle. Vehicle cranes (when present) must be operable at all times. Inability to safely lift, rotate, lower, or support rated loads will be considered an operational mission failure.

6.3.19.3. MTV Tractor. Couple/Decouple Function. The MTV tractor must be able to couple and decouple from appropriate semitrailers at all times.

6.3.19.4. MTV/LMTV Shelter/Van Variants. No unique mission essential functions exist for the basic shelter or van. The many different shelter and van variants will each have unique requirements due to differing missions. Rather than attempt to define all possible missions now, unique mission essential functions will have to be developed prior to testing of each new type of shelter or van variant.

6.3.19.5. MTV Wrecker. The wrecker must be capable of performing the following tasks:

6.3.19.5.1. Tow Function.

a. The wrecker must be capable of achieving 35 mph while towing the heaviest FMTV variant (wrecker) over dry, paved roads of up to two percent grade.

b. The wrecker must be capable of both flat towing and lift towing all loaded, supported vehicles from the front, and must be capable of both flat towing and lift towing all loaded, supported vehicles from the rear, except the MTV dump truck, wrecker, and extra long wheel base variants.

c. The wrecker must be able to lift-tow the heaviest FMTV variant up a 22% grade secondary road.

6.3.19.5.2. Winch Function

a. The wrecker must be capable of extracting all loaded, supported vehicles when mired to wheel depth. This does not imply that extraction of the mired vehicle and a mired trailer must be accomplished simultaneously.

b. The wrecker must be able to securely anchor itself in soil conditions of between 60 & 120 RCI. Anchoring may be accomplished by the use of any appropriate combination of vehicle brakes, hydraulic spades and/or self recovery winch.

c. The wrecker must be capable of extracting itself from mired situations either from the front or rear. Rear self-recovery must be accomplished by the use of the rear winch, and front self-recovery must be accomplished by the use of the self recovery winch.

6.3.19.5.3. Lift Function.

a. The wrecker must be able to lift 11,000 lbs and swing this load in an 11-foot radius as measured from the center of the crane pivot point.

b. The wrecker must be able to remove/install supported vehicle power plants and components.

6.3.19.6. MTV Dump. Receive/Dump Function. The MTV Dump Truck must be capable of receiving a full rated load of materiel under conditions described in the OMS/MP. Also, a fully loaded dump truck must be capable of safely unloading by dumping bulk materiel. This does not imply that the MTV Dump will be able to dump all loads as dumping may be inappropriate for certain types of cargo or materiel.

6.3.19.7. MTV/LMTV Trailer.

a. The trailer must be capable of accepting loads up to the rated trailer capacity.

b. The trailer must have the capability to be towed at speeds and over terrain conditions consistent with the prime mover without damage to trailer, load, or prime mover.

6.3.20. Craning Cycle. A craning cycle is defined as a pickup, move, and placement of a load. This shall be either a movement from the bed of the truck to the ground or vice versa.

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SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX A

MTV TRUCKS, CARGO

A.1. Cargo. The MTV shall have two (2) cargo models with MHE and two (2) cargo models without MHE (4 cargo models total) which shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this annex. Each model without MHE shall be provided with and without winch installed.

A.2. General Requirements. Bed sides shall be configured so that they pivot outward to a vertically locked down position (96 inch width restriction waived for this requirement only), and shall be removable by two people without tools. Removable components shall have recesses or specific handles to facilitate removal and handling. Storage space shall be provided, which does not infringe upon the bed area, for dropsides and posts when not in use. The cargo bed shall accept at all locations, with covering kit installed, loads up to 54 inches (137 cm) in height. Bed sides shall be a minimum of 18 inches (45 cm) above the floor of the cargo bed and be capable of withstanding lateral and longitudinal load forces as exerted by a 2,500 lb. (1,134 kg) pallet. The bed shall accept installation of the LMTV crane kit. The cargo beds shall meet Title 49 CFR requirements for highway ammunition shipment. An ingress/egress ladder shall be provided for the cargo bed, as part of tailgate or with mating slots at both rear corners of the cargo bed at the manufacturer's option. Ladder shall reach to the ground when the truck is parked on level concrete. The rearmost cargo bed side wall posts shall each incorporate a handle for ease of ingress/egress. Tailgate and cargo bed shall include sufficient hinging so the loss of one hinge does not render the tailgate and cargo bed unsafe to use.

A.2.1. Cargo Bed Tiedowns. The cargo body shall have tiedowns, conforming to MIL-STD-209H, except the cargo tiedown locations shall be in accordance with the technical data package provided with this solicitation. Tiedowns shall swivel 360^{o} and shall not protrude above the floor or side wall level when they are not in use. The rings must be accessible when the drop sides are in raised position. No portion of the bed shall fail when maximum rated load is placed on any opposing tiedowns.

A.3. Specific Requirements.

A.3.1. Trucks, Standard Cargo. The standard cargo truck shall have a minimum internal bed length of 14 feet (4.27 m) and a minimum usable width (with sides up and troop seat kits removed) of 90 inches (229 cm) and a total maximum width (sides removed) of not more than 96 inches (244 cm).

A.3.2. Trucks, Long Cargo. The Long Cargo (LC) version shall have a minimum internal bed length of 20 feet (6.10 m) and a minimum usable width (with sides up and troop seat kits removed) of 90 inches (229 cm) and a total maximum width (sides removed) of not more than 96 inches (244 cm).

A.3.3. MTV Crane. Selected MTV cargo truck and long cargo trucks shall have Material Handling Equipment (MHE). Cargo trucks which have the MHE shall be separate models, and shall meet all requirements in the FMTV performance specification. The MHE shall include a fully hydraulic constant torque 35,000 ft-lb (47,500 N-m) crane powered by the vehicle's hydraulic system. The crane shall be operated by controls at the side of the vehicle, and a remote control shall be provided. The crane for road and air transportability shall not exceed 96 inches (244 cm) width and shall not extend beyond the chassis frame nor below 30 inches (76 cm) above the ground. The design of the complete crane assembly with mounting hardware shall be such that when installed and during operation the unit stress on any member shall not exceed the margin of safety provided in SAE J1063 when tested accordingly. All exposed hydraulic lines and fittings shall be shielded to preclude damage when the crane is interfacing with other vehicles, and ancillary equipment specified herein, or caused by terrain or natural obstacles.

Crane design shall provide for smooth and quiet operation, ease and flexibility of operation, and versatility of performance. Crane shall comply with Mobile and Locomotive Cranes, ASME/ANSI B30.5. A flexible/swiveling 1 foot (31 cm) minimum interface is required between boom and hook to facilitate attachment of the load, without precise positioning of the boom. Vertical lift of load is required. All cranes shall be fully operable without movement of other on-vehicle equipment, such as spare tire/carrier assemblies. The crane shall include a minimum of two removable worklights with sufficient power cord to illuminate all areas within the span of the crane boom. These lights shall require specific override action to activate during the blackout mode. All crane booms shall have a fixed location for stowage of the hook assembly. A means shall be provided which prevents the load hook assembly from contacting the upper pulley (Anti-two blocking). The crane shall be designed and manufactured to withstand 60,000 maximum working load full operation cycles without structural fatigue failure.

A.3.3.1. Location & Capability. The crane shall be mounted on or near the longitudinal centerline of the truck to the rear of the cargo bed and be capable of:

c. Lifting 2,500 lb. (1,134 kg) to a minimum of 14 feet (427 cm) lift radius to allow pick up of a pallet or item of cargo at the outermost location of the cargo body. The crane shall be capable of off-loading pallets to either side of the vehicle.

d. Lifting 5,000 lb. (2,268 kg) at 7 feet (213 cm) lift radius.

e. The crane shall have a lift radius minimum such that a pallet can be loaded or unloaded from the rearmost portion of the cargo platform. (Lift radius distance as measured from the crane's rotational center to the center of the lifting hook).

f. The crane shall have a minimum working traverse of 370° with a rated capacity of 125% of static capacity at inner and outermost reach. The traverse overlap shall be toward the rear of the vehicle.

A.3.3.2. Stabilizing System. Outriggers shall be fully hydraulically operated and mounted directly to the crane base or chassis frame of vehicle. The outrigger legs shall be independently hydraulically controlled for leveling the vehicle on slopes up to 7%. The outrigger legs shall use check valves to lock in place when extended in order to stabilize the vehicle at all times. The outrigger legs when extended shall have creep of not more than 1 inch (2.5 cm) in 30 minutes with truck and crane boom at maximum load, boom at maximum extension. The outrigger legs shall not protrude into the plane of the departure angle and shall positively lock when in stowed position. The stabilizing system shall be designed such that when operating an unloaded truck, with tires at highway pressure, crane at maximum capacity, the system tipping moment shall not exceed 85% of the system righting moment when tested in accordance with SAE J765, except that the test shall occur on a 7% lateral slope. The stabilizing system safety requirements shall be in accordance with those defined in ANSI/ASME B30.5. The landing pads shall be capable of holding and stabilizing the crane at maximum load on level ground with soil strength conditions of 60 Rating Cone Index (RCI) at the 6 to 12 inches (15 to 30 cm) depth soil layer. If not designed to be attached to the landing legs during vehicle movement, pads shall be pinned to landing legs for quick removal and stowable by the full range of Army users. A safety switch shall be integrated with the system to preclude use of the crane unless outriggers are in place.

A.3.3.3. Crane Hydraulic System and Controls. Integrated within the hydraulic system shall be the necessary hydraulic cylinder(s), strainer(s), filter(s), reservoir(s), pressure relief valve(s), and all necessary lines, lockout(s), restrictor(s), and control valve(s) to insure positive and safe control of all operations and to provide protection in the event of a hydraulic power failure. The hydraulic filters and strainers shall be located to provide direct access and to allow removal without causing damage to the vehicle. Bypasses shall be furnished where necessary to protect filters during cold temperature operation. A means shall be provided for bleeding all air trapped in the hydraulic system. A means shall be provided to lower any load to the ground in the event of a hydraulic system or control failure. All cylinder rods which are exposed during operations shall have a hard chromium plating with a crack-free thickness sufficient to pass the porosity test of SAE-AMS-QQ-C-320. No chromium plating or

other surface violating camouflage considerations shall be exposed except during crane operation. All high-pressure hydraulic hoses and fittings shall be capable of withstanding a bursting test pressure of four times the working pressure and proof pressure of at least two times the working pressure. High-pressure hydraulic hoses shall be capable of operation on OE-10, OE/400/-10, Grade 10 oil conforming to MIL-PRF-2104 and OEA under Arctic Conditions. There shall be no leakage of hydraulic fluid past couplings or seals at maximum load and speed within the operational conditions cited herein. Hydraulic circuitry shall be provided which shall enable the crane to maintain vertical downward creep not to exceed 1 inch (2.5 cm) thirty (30) minutes after stabilization with maximum load at maximum lift radius (minimum 15.5 feet, 472 cm). Directional control valves shall be designed to permit operating a minimum of two functions simultaneously. The crane control actuation directions shall comply with Table A-1 (as applicable):

TABLE A-I

CONTROL

Crane Action	Vertically Mounted	Horizontally Mounted
Boom Up	Move Knob Up	Toward Operator
Boom Down	Move Knob Down	Away From Operator
Boom Extension In	Move Knob Down	Away From Operator
Boom Extension Out	Move Knob Up	Toward Operator
Crane Winch Up	Move Knob Up	Toward Operator
Crane Winch Down	Move Knob Down	Away From Operator
Crane Winch CW	Move Knob Up	Toward Operator
Crane Winch CCW	Move Knob Down	Away From Operator
Crane Mast Down	Move Knob Down	Away From Operator
Crane Mast Up	Move Knob Up	Toward Operator
Outrigger Pad Up	Move Knob Up	Toward Operator
Outrigger Pad Down	Move Knob Down	Away From Operator

Table A-I does not define mounting position or location. Vertical and horizontal nomenclature indicates direction of control knob movement.

A.3.3.4. Fixed Operator's Station. All crane controls and indicators shall be located within clear view and easy reach of the operator at the fixed operator's station and shall be readily accessible under all conditions of operation. Each functional control, both crane and outrigger, shall be of the deadman type automatically returning to the neutral position should the operator inadvertently or intentionally release the control. All controls governing a function (rotation, boom extension and retraction, vertical lift and drop) shall be proportionately variable. All controls shall be clearly marked as to use and function. Control spacing and size shall be such that they are operable by an operator wearing arctic mittens. Controls shall be waterproof and performance shall not be diminished when tested in accordance with MIL-STD-810, Method 506.4 Procedure 1. Controls shall be protected from weather and accidental damage.

A.3.3.5. Remote Control. The remote control system shall operate the spools of the directional control valve. Remote control shall be proportionally variable, provided with an emergency shut down capability and designed such that when activated, all crane functions cease. It shall not leak or have diminished performance when tested in accordance with MIL-STD-810, Method 512.4, Procedure I. The remote control shall be shock resistant IAW MIL-STD-810 Method 516.5, Procedure I and operable at any location within 25 feet (7.6 m) of the crane base. Remote control connection shall be at the rear of the cargo box. The remote control box weight shall not exceed 10 lb. (4.5 kg) and be designed in accordance with MIL-STD-1472. A shoulder strap shall be provided with each remote control box. The controller shall have multiple functions to match control levers on fixed control

except for the mast and outrigger controls. A stowage box shall be provided for the remote control which shall be lockable with a standard padlock, padded to take shock loads, and waterproofed against impingement of water from a 5/8 inch hose at 80 psi from any direction.

A.3.3.6. Transportability. The crane shall meet all FMTV transportability requirements without preparation.

A.3.3.7. Overload Shutdown System. The crane shall be provided with overload protection which shall preclude structurally overloading the crane. The system shall initiate shutdown of crane functions, except for functions which would reduce or alleviate the overload condition when any crane movement causes the moment on the crane to exceed 110% of the crane's rated capacity. Shutdown shall be completed within a period of time such that a load exceeding 110% of the crane's rated capacity cannot be lifted to a height of more than 18 inches above ground level when lifted at maximum winch speed. Loads of more than 150% of the crane's rated capacity shall not leave the ground.

A.3.3.8. LineLoad Winch. The crane shall provide vertical lift using one control. If utilized, the line load winch shall not prevent the crane from folding into the stowed position to meet the requirements set forth in this specification. The winch shall have the capacity of lowering or raising a 5,000 lb. (2,268 kg) load at a speed not less than 30 feet/min (9 m/min) and shall comply with ANSI/ASME B30.5. The crane manufacturer shall supply a minimum of 50 feet (15 m) of nontwist wire rope with a safety factor of not less than 350 % of rated capacity of the winch. The pitch diameter of the drum or sheave(s) shall not be less than 18 times the diameter of the rope used. No less than two full wraps of rope shall be remaining on the hook line drum when the hook is in its extreme low position with the boom at maximum extension in the most upright position. The winch shall be operable by the fixed and remote controls for the crane. The winch shall have a braking system for lowering in accordance with ASME B30.5. The system shall distribute the cable evenly and tightly over the width of the spool while winching in or out from zero to maximum rated load. The distribution requirement shall not interfere with the winching speed (in or out) of the cable.

A.3.3.9. Signs. Shall be in black characters on a background field of green.

A.3.3.9.1. Crane Instruction Plate. Two crane operating instruction plates shall be furnished conforming to A-A-50271 Composition A, Class II, one at the fixed control station, and appropriate operating instructions on the remote control unit.

A.3.3.9.2. Outrigger Leg Sign. One sign conforming to A-A-50271 Composition A, Class II, on 1 in. lettering, shall be placed next to the control station stating CAUTION, OUTRIGGER BEAMS MUST BE FULLY EXTENDED AND OUTRIGGER LEGS IN PLACE BEFORE LIFT CAN BE MADE.

A.3.3.9.3. Load Capacity Sign. A load capacity sign shall be visible from each control station conforming to A-A-50271 Composition A, Class II.

A.3.3.9.4. Boom Angle Indicator. A boom angle indicator shall be provided visible from both sides which shall indicate the boom's angle from maximum elevation to maximum depression relative to horizontal and marked in 5° increments with 0° correlating to horizontal. The boom angle indicator shall show a direct correlation to the crane load capacity.

A.3.3.9.5. FMTV MHE Boom Extension Indicator. A boom extension indicator shall be provided which shall be visible from both sides and shall indicate the boom's extension from minimum retraction to maximum extension. Each boom section shall be marked at one (1) foot, maximum, intervals. Marking shall be lusterless black color #37030, or lusterless green 383 color #34094 if placement of markings in a black area of the camouflage is required.

A.4. General Requirements Check. To determine conformance to para A.2, the MTV cargo variant shall be checked for the requirements specified.

A.4.1. Cargo Bed Tiedown Test/Certification. To determine conformance to para A.2.1, the MTV cargo variant shall be inspected for location and 360° operation of tiedowns in accordance with the specified requirements. Tiedowns shall be tested, in vehicle, to the minimum rated tensile strength without deformation to the tiedown or attachment members. Prior to First Production Vehicle Inspection, the contractor shall certify that the cargo tiedowns meet the requirements of MIL-STD-209H.

A.4.2. Trucks, Standard Cargo, Check. To determine conformance to para A.3.1, the MTV variant shall be inspected to the requirements specified.

A.4.3. Trucks, Long Wheel Base, Check. To determine conformance to para A.3.2, the MTV variant shall be inspected for the requirements specified.

A.4.4. MTV Crane Check/Test/Certification. To determine conformance to para A.3.3 the MTV crane variant with material handling equipment (MHE) shall be operated using all controls and checked for hydraulic system leaks. No leaks allowed. The crane shall be checked for location of controls; shielding on all exposed hydraulic lines, fittings, and specified ancillary equipment; presence of a flexible/swiveling one (1) foot interface between boom and hook; presence of a minimum two (2) removable work lights; and presence of a fixed location for stowage of the hook assembly. The MHE, during testing at a Government proving ground, shall be tested periodically for 35,000 lb-ft hydraulic constant torque and operational requirements. Prior to First Production Vehicle Inspection, the contractor shall certify that the complete crane assembly meets or exceeds the margin of safety provided in SAE J1063, that the crane design complies with ANSI B30.5, and that the crane withstands 60,000 full operational cycles at maximum load without any signs of fatigue failure.

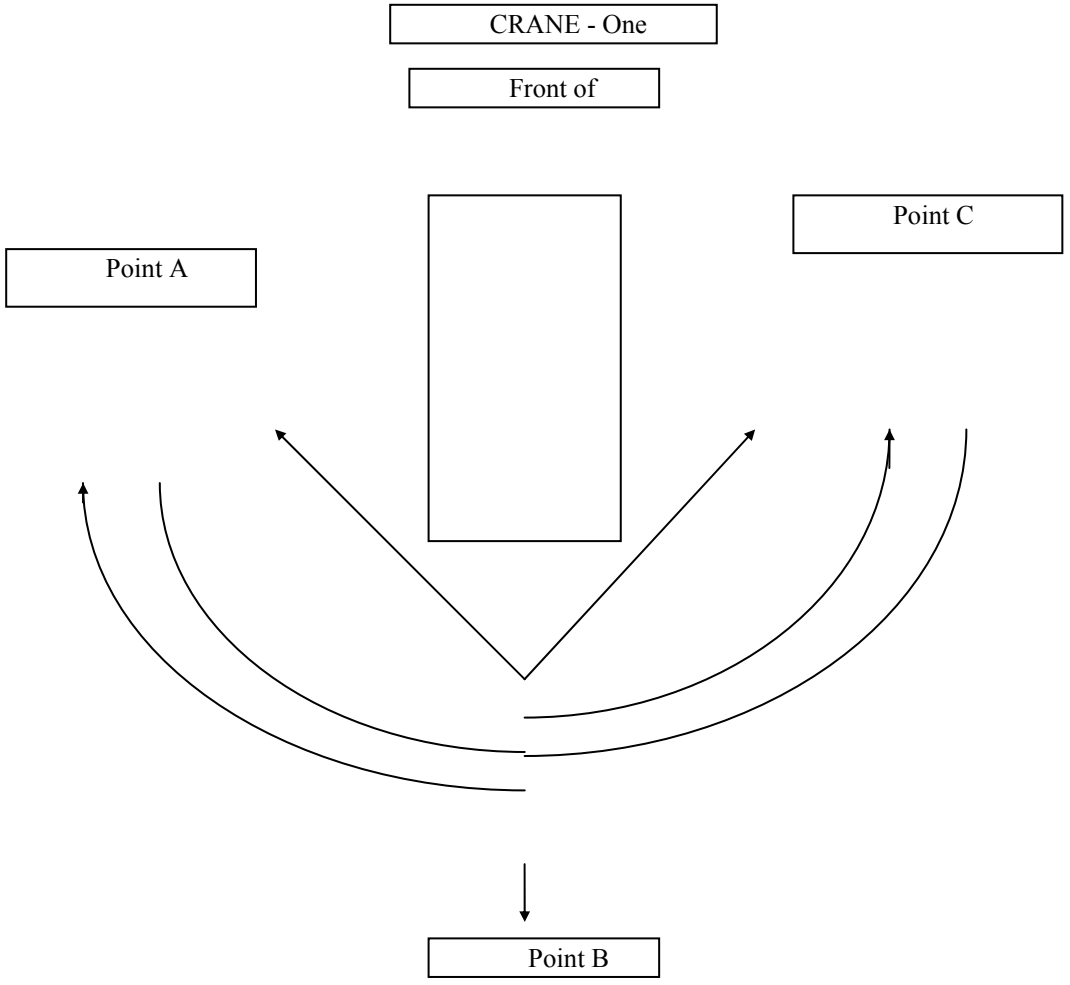
A.4.4.1. Location & Capability Check/Test/Certification. To determine conformance to para A.3.3.1, the crane shall be checked and tested during FPVI and Control testing for the location and operational requirements specified. Prior to First Production Vehicle Inspection, the contractor shall certify the crane complies with all federal OSHA safety standards. During control testing, the crane shall be operated for a minimum of 40 cycles. During QCI, 10 cycles shall be conducted. The remote and operator's station shall be used during this inspection. One cycle for this test is defined as raising and lowering a 2,500 lb. weight at three different points during a complete traverse of the crane (see Figure A-I). The weight shall be raised 5 feet from the ground during each lift without touching any part of the vehicle.

A.4.4.1.1. Load Test. In addition to all other required inspections and tests, the contractor shall perform load testing of MHE/MHC on all vehicles produced IAW IETM 9-2320-392-34 using the latest version. Specifically, Direct Support Maintenance Procedures titled Crane Load Test, paragraphs titled Static Overload Test (5,500 lbs.) and Dynamic Test (2,200 lbs.) shall be performed. Paragraph titled Static Overload Proof Test DOES NOT apply.

A.4.4.1.2. FIR Incorporation. The required Load Test shall become part of QCI and incorporated into the government Final Inspection Record (FIR) as it applies to variants with MHE/MHC.

A.4.4.1.3. Marking/Stenciling. The load rating and date of next periodic inspection (1 year from date of performing load test) shall be stenciled on crane booms. The stencil shall be of sufficient size and location so it will be clearly visible by the operator from the ground and operator's position.

A.4.4.1.4. Certification. The contractor shall certify performance of load test by annotating the DA Form 2408-9, which accompanies each vehicle, with the following statement in the remarks section: "Certify crane load test performed on (date) IAW TB 43-0142 and vehicle TMs".



In the event the vehicle is not shipped within 30 days of the QCI, another 10 crane cycles shall be conducted prior to vehicle shipment. The crane and vehicle hydraulic systems will be inspected for leaks, chaffing, and proper operation of the controls during this testing.

A.4.4.2. Stabilizing System Check/Test/Certification. To determine conformance to para A.3.3.2, the outriggers shall be checked for operation, location and safety switch requirements specified. During Control Tests (para 4.5) the outriggers shall be tested for independent control of vehicle leveling on slopes up to 7%, check valve operation, and creep requirement, at maximum crane boom load and at maximum boom extension. Prior to First Production Vehicle Inspection, the contractor shall certify the stabilizing system tipping moment does not exceed 85% of the system righting moment when operating the truck unloaded, with tires at highway pressure, and crane at maximum capacity while tested in accordance with SAE J765 (the test shall be conducted on a 7% lateral slope). Prior to First Production Vehicle Inspection, the contractor shall also certify that the stabilizing system safety requirements are in accordance with ASME B30.5.

A.4.4.3. Crane Hydraulic System and Control Tests. To determine conformance to para A.3.3.3, the hydraulic system shall be tested during testing at a Government proving ground for safe control of operations during a simulated hydraulic failure, for direct access to hydraulic filters and strainers without causing damage to the vehicle, for protection of filters during operation in cold temperatures, for bleeding trapped air in the hydraulic system, for lowering loads during a hydraulic or control system failure, for the creep requirement specified, for the control valve functions specified, and for the crane control actuation directions specified. The crane shall be checked periodically during testing at a Government proving ground for hydraulic fluid leakage. None is allowed. The contractor shall submit test documentation at FPVI showing compliance to the chromium plating requirement, to the hydraulic hose(s) burst and proof test requirements, and hose compatibility to the oils specified.

A.4.4.4. Fixed Operator's Station Check/Test. To determine conformance to para A.3.3.4, during testing at a Government proving ground the fixed operator's station shall be checked for the operational requirements specified. The contractor shall submit test data during FPVI that the controls are waterproof and performance is not diminished when tested in accordance with the standard specified.

A.4.4.5. Remote Control Check/Test/Certification. To determine conformance to para A.3.3.5, the remote control shall be checked for operation, for leakage, for operational location distance specified, for weight specified, and for presence of the stowage box specified. During Control Tests (para 4.5) the remote control shall be tested for proportional variability, emergency shutdown capability, cessation of crane functions, multiple functions specified, and waterproofness. During testing at a Government proving ground, the remote control shall be tested for HAEMP and EMI requirements. Prior to First Production Vehicle Inspection, the contractor shall certify to the standards specified.

A.4.4.6. Transportability Test. To determine conformance to para A.3.3.6, the crane shall be tested at a Government proving ground for the FMTV transportability requirements specified.

A.4.4.7. Overload Shutdown System Test. To determine conformance to para A.3.3.7, the crane shall be tested for the overload shutdown requirement specified.

A.4.4.8. Line Load Winch Check/Test/Certification. To determine conformance to para A.3.3.8, the wire rope shall be checked for the type and length specified. The drum or sheave(s) shall be checked for the diameter specified. During Control Tests (para 4.5) the crane shall be tested for the vertical lift specified, for the line load winch folding into the stowed position (if utilized), for the winch capacity of lowering or raising the load specified, for the two full wraps of rope remaining on the hook line drum as specified, for operation in the fixed or remote configuration, for the braking while lowering in accordance with ASME B30.5 requirement, and for the distribution requirement specified. Prior to First Production Vehicle Inspection, the contractor shall certify the winch meets the requirements specified.

A.4.4.9. Signs Check. To determine conformance to para A.3.3.9 (inclusive), the crane shall be checked for all instruction plates, signs, markings, and angle indicator requirements.

ANNEX B

MTV DUMP

B.1. Dump. The MTV shall have a dump truck model (provided with and without winch) which shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this annex.

B.2. General Requirements. The dump body shall be capable of continually transporting and dumping loads with a volume of up to 5 cubic yards (4 m^3) weighing at least 10,000 lb. (4,536 kg). The dump bed lifting and lowering assembly must be able to lift a 5 cubic yard load of material, but be rated to safely lift 7 tons total weight. Dump body shall be activated by controls within the cab.

B.3. Specific Requirements.

B.3.1. Dump Body. The dump bed structural integrity must demonstrate the ability to withstand the loading, unloading, hauling, spreading, lifting or lowering of a wide range of materials, which may range from moist sand to rubble debris with imbedded re-bar for the expected life span of the current dump bed configuration. The complete dump bed floor structure must be capable of withstanding the impact of material and/or debris being loaded into the dump bed assembly regardless of the material's position/location in the dump bed. Deformation of the dump bed floor and structure must not exceed fair wear and tear.

B.3.1.1. Dump Angle. The dump body (at GVW), with an evenly spread load, shall be capable of tilting/lifting to a 60° minimum dump angle when on a grade of 7% in any direction. The dump angle of 60° minimum shall be measured between the stationary subframe and movable portion of the dump bed.

B.3.1.2. Safety Lock. A safety lock permanently affixed to the dump body shall be furnished. The safety lock shall provide positive retention of the dump body with the body in the up position for servicing or repair. The safety lock shall not interfere with the operation of the body when not in use. The dump lever shall be so configured as to prevent inadvertent actuation.

B.3.1.3. Attachments. The dump body shall accept side racks, cover kit and troop seats for dual application as a personal carrier. Side racks shall not be used to meet basic volume or load-carrying requirements. A cover kit for loose cargo such as stones and rocks shall also be provided. Mounting provisions for all kits shall not be affected by use of the dump bed for dump operations. All cover or tarp bow mounting provisions shall be self-cleaning.

B.3.1.4. Cab Protector. A cab protector shall be attached to the front end of the dump body and shall extend the full width of the cab. It shall extend not less than 3 feet (1m) from the front end of the dump body. The protector shall be capable of supporting an evenly distributed load of at least 1,500 lb. (680 kg). The protector shall not be used for additional payload capacity. The protector may be stored in the dump body in order to meet transportability requirements. The protector shall be removable if necessary for installation and operation of the vehicle mounted weapons.

B.3.1.5. Tailgate. The tailgate shall be double acting, opening from the top or the bottom. The bottom tailgate latch shall be operable by a control which is easily accessible to the driver. The upper tailgate securement pins shall be capable of being installed or removed from inside the bed without any special tools. The lower tailgate securement pins shall be capable of being installed or removed from ground level outside the truck without any

special tools. The securement chains for the pins shall be long enough to allow pins to be installed with ease. The tailgate shall meet the same performance of the dump bed as specified in para B.3.1.

B.3.1.6. Dump Bed Tiedowns. The dump body shall have bar assemblies tiedowns, welded to each side between the dump bed ribs, outboard of, spanning the length of, and midway between the top and the bottom of the dump bed. The tiedown bar assemblies shall meet the pull requirements specified in MIL-STD-209H for cargo tiedowns (5,000 lb.). No deformation shall be noted to any point on each of the bar assembles or the surrounding structural components when maximum rated load is placed on any opposing tiedowns.

B.3.1.7. Ladder. An ingress/egress ladder with stowage hardware shall be provided for the dump body, as part of tailgate or with mating slots at both rear corners of the dump bed at the manufacturer's option. Ladder shall reach to the ground when the truck is parked on level concrete. The troop seat kit shall incorporate a handle for ease of ingress/egress.

B.3.1.8. Volcano Mine Dispensing System. The dump truck shall be equipped with provisions to mount and operate the Volcano Mine Dispensing System.

B.4. General Requirements Check. To determine conformance to para B.2, the MTV dump truck variant shall demonstrate the ability and capability to transport, dump, and hold a minimum volume of 5 cubic yards of material, which may exceed the specified 5 ton load chart but not exceed 7 tons. The dump gate shall be operated by the driver for the requirement specified.

B.4.1. Dump Body Check. To determine conformance to para B.3.1, dump body integrity will be checked for deformation and damage.

B.4.2. Dump Angle Check. To determine conformance to para B.3.1.1, the dump body at GVW shall be checked for the capability of tilting/lifting an evenly spread load at a (60° minimum) dump angle when the vehicle is on a 7% slope.

B.4.3. Safety Lock Check. To determine conformance to para B.3.1.2, the dump body shall be checked for a permanent safety lock which shall provide a positive retention when the dump body is in the up position for servicing/repair and shall not interfere with the operation of the body under any condition.

B.4.4. Attachments Check. To determine conformance to para B.3.1.3, the dump body shall be checked for the acceptance of side racks, tarpaulin, bows, end curtains and troop seats for the dual application as a personnel carrier.

B.4.5. Cab Protector Check. To determine conformance to para B.3.1.4, the cab protector shall be checked for attachment to the dump body and shall extend the full width of the cab and not less than 36 inches from back of the cab. The cab protector shall be checked for the support of a load of 1,500 lb., and its stowage to meet the transportability requirement.

B.4.6. Tailgate Check. To determine conformance to para B.3.1.5, the tailgate shall be checked for double acting, opening from top or the bottom. Verify the upper tailgate pins are capable of being installed or removed from inside the bed without special tools. Also verify that the lower tailgate pins are capable of being installed or removed at ground level without special tool. Verify accessibility and ease of operation for the tailgate latch control.

B.4.7. Dump Bed Tie Downs. To determine conformance to para B.3.1.6, the Dump bed tiedowns shall be pull tested to the requirements specified in MIL-STD-209H for cargo tiedowns during testing at a government proving ground.

B.4.8. Ladder Certification/Verification. To determine conformance to **Error! Reference source not found.**, the ladder shall be checked during FPVI for proper length, stowage, and mounting location. During Quality Conformance Inspection, the ladder shall be checked for stowage and mounting location specified.

B.4.9. Volcano Mine Dispensing System. To determine conformance to B.3.1.8, the dump truck shall be tested to verify proper mounting and operation of the Volcano Mine Dispensing System when mounted on an MTV Dump Truck.

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SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX C

EXPANSIBLE VAN

C.1. The MTV shall consist of an expansible van. It shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated), and all requirements of this annex. The vehicle shall be stationary when the van is expanded (full or partial).

C.2. General Requirements.

C.2.1. Van. The MTV shall have an expansible van with a body which shall have a minimum expanded volume of 1,450 cubic feet and a payload capacity of the chassis, but not less than 5,000 lbs.

C.3. Specific Requirements.

C.3.1. Expansible Van.

C.3.1.1. Expansible Van Body. The Expansible Van roof, side panels and end panels shall be connected to each other and shall expand and contract as one piece. The expansible van body's outer skin shall be aluminum and shall expand without interference, binding, or damage to the vehicle and any part of the expansible van body or equipment. All locks and fasteners shall be positive in securing the extended portion to the basic expansible van body. All joints shall prevent dust from entering the interior during transit or when in the expanded mode. The expansible van body shall be capable of safe expansion or contraction by two crew members (at least one of which is a 5th percentile female) using only on-board tools and power. The total set-up or tear-down time for these actions shall be no more than 30 minutes for either operation. A means shall be provided to automatically prevent over-expanding the expansible side sections.

C.3.1.1.1. Roof. The roof shall be capable of being walked on by a 95th percentile male (250 lbs) while broom clearing up to 6 inches of wet snow, without damage, prior to retracting the sides. Roof panels shall be secured to prevent panel vibration.

C.3.1.1.2. Dimensions. Length: At least 204 inches (518 cm) as measured from the interior. Width: At least 79 inches (201 cm) internal, in a non-expanded state. At most 96 inches (244 cm) external, overall, in a non-expanded state. At least 160 inches (406 cm) internal, at full expansion. Height: The internal height shall be a minimum of 74 inches (187 cm), however, the expansible van shall not exceed 149 inches (378.46 cm) overall.

C.3.1.1.3. Transportability. The expansible van body shall be transportable as specified in the main body of the FMTV specification. Lifting requirements shall be as defined in the main body of the FMTV specification. All van body lifting and tiedowns shall conform to MIL-STD-209H. All lifting shall be accomplished without the use of spreader bars. For rail, C130 and C141 transport, the van body shall be removed from the chassis. On-body tool requirement for lifting of van body does not apply. Van body can be lifted using an external source such as a crane.

C.3.1.1.4. Air Transport. The expansible van body, with payload, shall be capable of being completely removed or installed on the chassis, by 2 people within 1 hour. The body shall have skid rails for loading the body onto a K loader and have unrestricted transportability on a C5 and C17.

C.3.1.1.5. Waterproofness. The expansible van body shall be waterproofed to provide a water-tight structure. Doors and other closures shall be carefully fitted and adjusted to provide a water-tight seal. The interior of the van body shall evidence no water leakage or moisture penetration from any cause (rain, snow or road splash).

C.3.1.1.5.1. Seals. The seals for the expansible van shall be water insoluble and shall not harden; shall prevent the entrance of water, snow or dust into the interior when in a travel or expanded mode; shall have flexural and compressibility characteristics within the stated environmental characteristics (-50^0F to $+120^0$F); shall not absorb moisture; and shall not extend beyond the 96-inch width of the vehicle. Seals for the expansible sections and all door and window openings shall have the service life of one year with the van being expanded and retracted each day. During this period all such seals shall not be degraded sufficiently to result in failure to pass the waterproofness, lightproofness or dust test. All such seals, in both side sections, shall be capable of being removed and replaced with new seals by a two man crew at the organizational level in not more than 2 hours, without using lifting equipment or metal cutting tools.

C.3.1.1.6. Rear Doors. The expansible van body shall be provided with 2 equal size lockable side-hung rear doors, which shall have waterproof joints as defined in C.3.1.1.5. The doors when fully opened shall provide a clear opening of at least 54 inches (137 cm) wide and 74 inches (188 cm) high. A door check shall be provided on each door, arranged to hold the door at 115° and 180° open positions. The door checks shall keep the doors opened while on a 30% side slope. One door shall have a window which allows a passenger to view someone on the outside steps prior to opening the doors. Door gaskets shall prevent the penetration of light, wind and rain when doors are closed.

C.3.1.1.6.1. Side doors. The expansible van body shall be provided with 1 lockable door on each side of the van. The doors shall be positioned half way between the rear of the van and its center (3/4 of the distance from the front of the van). A door check shall be provided on each door, arranged to hold the door at 115° and 180° open positions. The door checks shall keep the doors opened while on a 30% side slope. Each door shall have a window which allows a passenger to view someone on the outside steps prior to opening the doors. The door gaskets shall prevent the penetration of water (as defined in C.3.1.1.5), light, and wind when the doors are closed.

C.3.1.1.6.1.1. Door Latches, Hinges and Hardware. When doors are opened, the hinges, latches and door-checks shall not protrude into the expansible van body. All doors shall have hardware or devices to prevent inadvertent opening and closing. In addition to the door operating handle, a minimum 6 inches (15 cm) grab handle shall be provided on the inside of each door. Door stops to prevent damage to body sides shall be provided for each door. A handle operable from the inside even if key locked externally shall be provided. Inside door handles shall be designed and placed to minimize inadvertent operations (opening a door) when accidentally hit or used as a grab handle.

C.3.1.1.6.2. Warning Light. A warning light shall be provided. The light shall be located in the driver's compartment, in plain view of the driver, and shall flash when any door is not securely latched closed or the expansible sides are not properly latched for travel. The light source shall not be visible from outside the vehicle and shall be interconnected with a low sound level buzzer. The warning light and buzzer shall be operable when the ignition switch is in the run position.

C.3.1.1.7. Steps, Platforms, and Ladders.

C.3.1.1.7.1. Steps and Platforms. Aluminum steps, and a platform at the top of the steps, for one side door and the rear doors (one set for double rear doors) which conform to all Human Factor requirements shall be provided. Steps and platform shall be centered, be at least 24 inches (61 cm) wide and shall have a non-skid design. Steps and platform shall be readily accessible and stowable by one person and shall not be subject to damage during any vehicle operating condition. A means shall be provided in each stairway side member to retain handrails. The

handrails shall be installed by one soldier in less than 15 minutes using only on-board, common hand tools. The stairway (except for the handrails) shall not interfere with the opening and closing of the doors. The platform shall be at least as wide as the door opening and deep enough to allow the operator to open the door (from the outside) without having to step off the platform. The ladder shall have a "DANGER" marking warning personnel that the ladder conducts electricity. The side platform and steps shall be interchangeable from road side to curb side. The side platform shall be available as a kit. Each step shall be capable of withstanding, without damage or permanent set to any of the ladder parts, a 500 pound load centrally applied on the top of the front step member (tread) and perpendicular to the step. This requirement shall be verified with the ladder in service position and a 500 pound load applied separately (not concurrently) on each step. This load shall be concentrated within the area of a 2-inch diameter circle at the midpoint of the step. Maximum vertical deflection shall be not more than .025 inch midway between supports. The handrails shall be capable of supporting, vertically and longitudinally, 3 personnel of 200 lbs. each leaning on the handrails, without any permanent deformation of the handrail, supports or fastenings.

C.3.1.1.7.2. Extension Ladder. The van shall be equipped with integral steps at the rear of the body which provide for safe roof access. These steps shall be exempt from MIL-STD-1472 requirements.

C.3.1.1.8. Insulation. The expansible van body shall be sufficiently insulated in order to maintain the temperatures described in this annex. The insulation shall not support combustion, corrode metals, absorb odors, disintegrate under vibration or settle and leave voids, nor sustain flame, mold, rot or vermin, and shall be essentially odorless. Insulation shall not be comprised of material containing asbestos. There shall be no blind (uninsulated) areas in the structure.

C.3.1.1.9. Interior Sound Level. The interior sound level in each of the areas, with the air conditioning system operating and then with the heating system operating, shall comply with category F, Table I of MIL-STD-1474 and shall not exceed 65 dB(A). After mounting on the vehicle, the air conditioner and heater noise levels shall not exceed those of the air conditioner and heater before mounting (no additional noise due to vibration, ducting, etc) unless the total level is less than 65 dB(A).

C.3.1.1.10. Floor Loads. The permanent portion of the expansible van body floor shall be capable of supporting a distributed load of at least 500 lbs/ft^2. The expansible portion shall be capable of supporting a distributed load of at least 300 lbs/ft^2. The floor in all locations, shall be capable of supporting a minimum point load of 100 psi without permanent deformation.

C.3.1.1.10.1. Deflection. With the side sections expanded and the van loaded to the specified 300 lb/ft^2 floor loads, and with the loads shifted into all possible combinations of distribution and concentration (e.g. 4,500 lbs grouped on any extreme corner of one expansible section, 4,500 lbs lined up along any one expansible outer wall, etc.), the entire floor shall remain level at all points. Deflection shall not exceed 1/4 inch within a 3 foot area when measured with a 3 foot straight edge. No visible warpage or deflection between floor section joints shall occur. After loading, the expansible sides shall retract and expand properly with no adjustments, off-tracking, binding or unusual efforts.

C.3.1.1.11. Windows. There shall be a minimum of 3 windows (approximately 2 foot square made of tempered glass) per side (in addition to door windows) with waterproof joints on each side of the expansible van body (when expanded). Windows shall include bug screens and blackout doors, and shall be capable of being opened and closed readily. Windows shall be capable of being locked when closed and shall have brush guards and a means of eliminating reflected sunlight from the windows on the outside. Windows must slide up and down rather than swinging out or in to open and close.

C.3.1.2. Electrical System. The electrical wiring within the expansible van body shall be provided with protection in accordance with the National Electrical Code and the National Fire Protection Association. The conductors within the tubing shall be color-coded. All connections and splices below the inside van floor shall be

waterproofed using MIL-Spec RTV or equivalent. All runs of Rigid Non-Metallic Conduit (RNC) inside the van higher than 3 feet above the van floor need have only one end solvent bonded rather than both ends as is required by Article 347.9 of the NEC.

C.3.1.2.1. Expansible Van Body Illumination. Illumination in the expansible van body compartment shall be of at least 75 foot-candle intensity, utilizing 110 volt external power, and at least 10 foot-candle intensity from vehicle 24 volt system measured 30 inches above the floor in all areas of the expanded van without any outside ambient light. If fluorescent lights are used, they shall have instant start capability. Any fluorescent fixture(s) shall have removable covers which positively lock in place. The fluorescent tube(s) shall also be positively locked in place to preclude loosening due to vehicle movement or vibration. There shall be a minimum of at least 8 each 24 volt emergency lights within the center section of the van. There shall be one in the vestibule, one at the front over, or near, the control panel, and at least two more, on each side of the electric raceway running along the outer edge of the ceiling of the center section and one located along the edge of the expanded ceiling between the A/C lights. Illumination shall be a minimum of 10 lux when measured at five locations. The readings should be taken approximately 30 inches off the floor surface.

a. At a location approx. 12 inches inboard from the door end wall and 24 inches inboard of the curbside wall.

b. At a location approx. 78 inches inboard from the door end wall and 48 inches inboard of the expanded side walls (2 locations).

c. At a location approx. 150 inches inboard from the door end wall and 48 inches inboard of the expanded side walls (2 locations).

d. At a location approx. 12 inches inboard from the front wall center.

e. At a location approx. 24 inches inboard of the expanded wall center (2 locations).

C.3.1.2.2. Power Requirements.

C.3.1.2.2.1. Exterior Power. The expansible van body shall be equipped with an exterior mounted power entrance box which shall contain at least the following:

a. 110/208, 3 phase VAC power in, with connector conforming to MS90558C52413P.

b. Telephone binding posts, 1 set (may be in separate signal box entry).

C.3.1.2.2.2. Power Distribution Panel. The expansible van body shall be equipped with an interior mounted power distribution panel. The panel shall provide at least the following:

a. Main power on-off control Main circuit breaker(s) (24 volt & 110/220).

b. Individual circuit breakers for: Air conditioner (220 volt), Ventilation fans (C.3.1.6), Interior Lighting (110&24 volt), Interior roadside and curbside outlets (110 volt) max. 3 outlets per 20 amp breaker.

c. Capability to direct wire equipment into the distribution box space for a minimum of 6 additional 20 amp circuit breakers (110/220 volt).

C.3.1.2.2.3. Switches. There shall be 2 three-way switches for both 110 volt and 24-volt internal lighting. The switches shall be located at the front and rear of the expansible van body. There shall be individual switches for

all environmental control equipment. There shall be 24 VDC switching which shall allow the vehicle to change to/from an external power source. There shall be one switch to override the normal lighting and activate the blackout mode in the van without having to exit the van. Each fluorescent light shall have an on/off switch. All switches shall have metal covers.

C.3.1.2.2.4. Interior Convenience Outlets. There shall be at least six (6) 110 volt, 3 wire duplex convenience outlet equally spaced along van length on both the driver and passenger sides. All outlets shall have metal covers.

C.3.1.2.2.5. Binding Posts. There shall be at least 1 pair 24 volt binding posts and 1 grounding post with cable along each 4 feet (122 cm) of van length on both the road and curb sides (at least 3 pair per side).

C.3.1.3. Light Security. The expansible van body (whether in travel or expanded mode) with doors closed and blackout doors covering windows shall be completely lightproof at all times under all conditions, precluding emission of light from the interior of the expansible van body and entrance of any illumination into the interior of the expansible van body.

C.3.1.3.1. Blackout Condition. Under blackout conditions, when any door or blackout shade violates light security, all lights internal to the expansible van body which are not intended for use during blackout shall be automatically shut off.

C.3.1.3.2. Blackout Lights. Blackout lights shall be provided in the expansible van body (at full expansion). Under blackout conditions when light security is violated, blackout lights which cannot be detected by infra-red (IR) sensing devices shall be automatically activated and non-blackout lights and one wall plug on each side, shall be automatically deactivated. Two wall plugs on each side shall not be automatically deactivated but shall have switches to deactivate them. All wall plugs shall be clearly labeled with their blackout activation status information.

C.3.1.4. RESERVED.

C.3.1.5. Climate. All temperatures specified hereinafter shall be recorded at the center of the interior expansible van body cube, when the expansible van body is fully expanded. Neither the heater(s) nor the air conditioner(s) shall intrude on the interior space of the van body and shall operate independently of the vehicle engine.

C.3.1.5.1. Heater. The van body shall be provided with a heater conforming to C.3.1.5.3. Vehicle 24 VDC shall be supplied for the operation of heater's fuel pump.

C.3.1.5.2. Air Conditioner. The van shall be equipped with provisions to accept an air conditioning system conforming to C.3.1.5.3. The air conditioning system shall be operable independent of the vehicle engine.

C.3.1.5.3. Climatic Conditions. The expansible van body shall be capable of reaching and maintaining an internal temperature of between 65^0F and 80^0F within 60 minutes after the heater or air conditioner is turned on when outside temperatures are between -25^0F and 120^0F. An air conditioning kit is allowable to meet this requirement.

C.3.1.5.4. Cold Conditions. For outside temperatures less than -25^0F to -50^0F, an internal temperature of at least 60^0F shall be obtainable and maintainable within 60 minutes after the heater is turned on. A kit is allowable to meet this requirement.

C.3.1.6. Ventilation. The expansible van body (at full expansion) shall be equipped with integral ventilation fan(s) and exhaust duct(s) which provide a complete change of air every 3 to 4 minutes. The air shall be dust and dirt filtered. Filters shall be readily accessible for ease of changing.

C.3.1.7. Actuation. A manual system for opening and closing the van body shall be provided. The crank shall be capable of rotating 360° continuously without being removed from the drive shaft. The crank shall be capable of rotating clockwise and counterclockwise without the use of a ratchet mechanism. Van shall be fully expanded or contracted using this system by two soldiers, one of which is a 5th percentile female, using only on-board tools in not more than 30 minutes.

C.3.1.8. Lubrication. All parts which require lubricants, whether considered by the manufacturer to be permanently lubricated or not, shall be provided with ready access for lubrication. Access panels or doors shall be installed as necessary, with hinged access door(s) used wherever space permits. All parts of the chassis running gear, body and installed equipment which require lubricants at the organization level shall be capable of being lubricated by one man in not more than 2 hours, including time to clean lubrication fittings and open and re-close access panels or doors.

C.3.1.9. Basic Issue Items (BII). The following BII shall be supplied with each van in addition to BII indicated in Annex N.

a. Extinguisher Assembly. 5 lb. chemical, with bracket, 2 required, NSN 4210-00-775-0127.

b. Padlock Set. 5 padlocks (all keyed alike) and 5 keys, NSN 5340-01-050-7059.

c. Spikes. Stabilizer anchor, 8 required, NSN 2590-00-870-9936.

d. Jacks. Leveling, portable, 4 required, with handles.

e. Plates. Leveling jack support, 4 required.

f. Cable. Ground, with rod, NSN 6140-00-851-4573.

g. Rod. Ground, with crossbar, NSN 2510-00-790-2296.

C.3.1.10. Interior Painting. The interior shall be painted IAW drawing 12420325 method 14. Interior of the doors shall be painted the same color as the outside of the van so that they shall blend in with the van when opened.

C.3.1.11. Cable Reel. A cable reel with 100 feet of cable rated at 100 amps shall be provided. One end of the cable shall have a plug conforming to MS90557C52413S which mates to the connector in para C.3.1.2.2.1.a. The other end of the cable shall have pigtail ends to connect to an auxiliary power unit.

C.3.1.12. Stowage. As needed, the vehicle shall be provided with lockable, waterproof stowage space for all BII and other equipment necessary to operate the vehicle in all mission scenarios, including in the expanded mode.

C.4. Van. To determine conformance to para C.1 and para C.2.1, MTV expansible van shall be checked at a Government proving ground IAW Table VII of Section 4 in the FMTV system specification.

C.4.1. Expansible Van.

C.4.1.1. Van Body Examination. To determine conformance to para C.3.1.1 and para C.3.1.1.2, the MTV van variant shall be checked in the travel and expanded positions for dimensions, expansion time, contraction time, interference, binding or damage to the van body or equipment. The lock and fasteners shall be checked for location and positive operation. The body shall be inspected for dimensions specified.

C.4.1.2. Roof Verification/Test. To determine conformance to para. C.3.1.1.1, the MTV van variant shall be subjected to a proof load to simulate 6 inches of wet snow and 5th through 95th percentile soldier placed on the roof on the van in the expanded mode. The weight shall be evenly distributed and remain in place for not less than one hour. At the end of the allotted time, the weight shall be removed and the van shall be retracted and again expanded. Evidence of interference, binding or damage to the van body or equipment shall be cause for rejection.

C.4.1.3. Transportability. To determine conformance to para C.3.1.1.3 and C.3.1.1.4, the transportability of the van shall be verified and tested in accordance with the FMTV specification paragraphs 4.7.31, 4.7.31.1 and 4.7.31.5. If the van body is removed for air transport, lifting and tiedown provisions shall be tested in accordance with the main body specification, para 4.7.31.6.

C.4.1.4. Waterproofness and Sealing Test. To determine conformance to para C.3.1.1.5, each expansible van body shall be subjected to waterproofness testing. Water testing shall comply with the requirements of MIL-STD 810E, section II, para 3.3, procedure III. The test shall be conducted in the closed mode and repeated in the expanded mode. During test, doors and windows shall be closed as in normal operation without any additional measures taken to improve the door or window sealing. Blackout shades shall be in the stowed position. Any evidence of moisture penetration or water leakage shall be cause for rejection.

C.4.1.5. Van Body Seals. To determine conformance to para C.3.1.1.5.1 the van shall be opened and closed a minimum of twice daily throughout the conduct of the reliability test. The vehicle selected shall have successfully passed waterproofness and lightproofness tests prior to running reliability miles. At the conclusion of reliability testing, the van shall again be subjected to waterproofness and lightproofness testing. Any evidence of light or water leakage or excessive degrading of van seals shall be cause for rejection.

C.4.1.6. Door Checks. To determine conformance to para C.3.1.1.6 to C.3.1.1.6.1.1, the van rear and side doors shall be checked for the specified dimensions and configuration/operation of door latches, checks, hinges and hardware. The doors shall be checked for specified open positions while on a 30% side slope.

C.4.1.6.1. Warning Light. To determine conformance to para C.3.1.1.6.2, the van shall be checked for proper operation of the warning light and buzzer during expansion and retraction. The system shall be monitored for proper operation during endurance, environmental, EMI and noise testing. Failure of the system to operate properly in all environments shall be cause for rejection.

C.4.1.7. Aluminum Steps and Platform Verification. To determine conformance to para C.3.1.1.7 to C.3.1.1.7.2 (inclusive), the van stairways, platforms and ladders shall be checked for specified position, dimension, and configuration. During government proving ground testing, one each stairway (with handrail) and platform shall be subjected to the imposed loads specified in para C.3.1.1.7.1. The loads shall remain in place for a minimum of 15 minutes. After loading, the items will be checked for deformation and on-vehicle storage.

C.4.1.8. Insulation Certification. The contractor shall certify that the material and application process for the selected insulation meets all requirements specified in para C.3.1.1.8. The effectiveness of the selected insulation shall be evaluated during environmental testing.

C.4.1.9. Interior Sound Level. To determine conformance to para C.3.1.1.9, the van in the expanded mode shall be subjected to noise level testing in accordance with MIL-STD-1474, Category F of Table I. With all systems operating, the interior noise level, as measured at the mid point of the expanded van, shall not exceed 65 dB(A).

C.4.1.10. Floor Loads. To determine conformance to para C.3.1.1.10 (inclusive), the van shall be placed on a level hard surface, the sides expanded and leveling jacks deployed. A 3 foot carpenter's level shall be placed on all floor sections in both the longitudinal and vertical axes to assure a level surface. The expanded van floor shall be proof loaded to the weights and positions specified. With each movement of the weight, the floor shall be measured to assure that a level surface is maintained. After loading, the van floor shall be inspected and measured for deflection or deformation. The expansible sides shall be retracted, expanded and checked for adjustment, off tracking, binding or unusual effort.

C.4.1.11. Window Verification. To determine conformance to para C.3.1.1.11, the van windows shall be visually, dimensionally and functionally checked. Windows shall be opened and closed a minimum of once daily during reliability testing. Evidence of malfunction or water leakage shall be cause for rejection.

C.4.2. Electrical System. To determine conformance to para C.3.1.2 (inclusive), the van's electrical system shall be inspected and tested as specified. The electrical installation to include interior and exterior lighting, power entrance box, power distribution panel, service and convenience outlets and switches, and air conditioner and heater wiring shall be inspected for proper configuration, operation and workmanship to approved electrical standards. The interior lighting in the van body shall be measured for the minimum illumination required in accordance with para C.3.1.2.1. The measurement shall be taken from the centerline of the floor with the blackout shades in place. All light fixtures shall be checked for illumination and loosening due to vehicle movement or vibration, a minimum of once every thousand miles of endurance testing.

C.4.2.1. Light Security Test. To determine conformance to para C.3.1.3, the MTV van variant shall have each van body in the basic and expanded positions, with doors and blackout shades closed, and placed in bright sunlight or exposed to high intensity illumination of at least 1,000 foot candles. No light shall be visible or detectable from inside the van body. The test shall be repeated at night with all sources of illumination operating within the van body, no light shall be visible or detectable from outside the van body.

C.4.2.2. Blackout Condition Verification. To determine conformance to para C.3.1.3.1 and para C.3.1.3.2, the van body, under blackout conditions with all internal lights activated, shall have the rear doors opened to verify that when the doors are opened the lights automatically are shut off and blackout lights, that cannot be detected by infra-red (IR) sensing devices are automatically activated. The rear doors shall then be closed to verify that when the doors are secured, the internal lights automatically activate and that the blackout lights automatically terminate. The test shall be repeated once for each window. When blackout shades are moved, causing a violation of light security, all internal lights shall be automatically de-activated and blackout lights shall be simultaneously and automatically activated. When blackout shades are placed securely back on windows, blackout lights shall be automatically terminated and internal lights shall be automatically restored.

C.4.2.3. Electromagnetic Compatibility. To determine conformance to para 3.2.1.12.1, the van shall be tested in accordance with MIL-STD-461E.

C.4.2.4. Climate. To determine conformance to para C.3.1.5 through C.3.1.5.4, the van shall be tested in the climatic conditions specified in C.3.1.5.3. The vehicle shall be soaked for a minimum of 24 hours in each temperature specified. The vehicle engine shall be started and the van expanded. Time to complete expansion and retraction shall be evaluated for compliance with para C.3.1.1. The van's heaters and air conditioners shall be operated for one hour and their efficiency evaluated against the temperatures specified in para C.3.1.5.3 and C.3.1.5.4. At each temperature range the van shall be expanded once using power actuation and once using manual actuation. Any evidence of binding, interference or damage to seals or equipment shall be cause for rejection.

C.4.2.5. Ventilation. To determine conformance to para C.3.1.6, the ventilation fan(s) shall be checked for operating efficiency and ease of service as specified.

C.4.2.6. Actuation. To determine conformance to para C.3.1.7, the van actuation systems shall be monitored for ease of operation and durability throughout all endurance and performance testing performed at the Government proving grounds.

C.4.2.7. Lubrication Demonstration. To determine conformance to para C.3.1.8, the van shall be subjected to a lubrication demonstration during testing at a Government proving ground. The demonstration shall be timed to assure that one person using only Army standard tools and lubrication equipment can perform all tasks in less than 2 hours.

C.4.2.8. Basic Issue Items. To determine conformance to para C.3.1.9, all basic issue items shall be visually and functionally checked to assure proper operation and on-board storage.

C.4.2.9. Painting. To determine conformance with C.3.1.10, the interior of the Expansible Van Body shall be checked for proper application of paint IAW the referenced specification. After application of the final coat of paint, the surface will be checked for smoothness and shall be free of grit, seeds, streaks, running, sagging, wrinkles pinholes craters and non-conformity of specified colors. The contractor's Quality Assurance System shall have methods and instructions for In-process Inspection to verify that cleaning, pre-treating, primer application, and top coat application procedures conform to the referenced requirements.

C.4.2.10. Cable Reel. To determine conformance with C.3.1.11, the cable reel specified shall be visually inspected. During testing, the cable and reel shall be functionally tested for compatibility and ease of operation. Non-compatibility , interference or binding of the reel shall be cause for rejection.

C.4.2.11. Stowage. To determine conformance to para C.3.1.12, the vehicle will be checked for lockable waterproof stowage space for all BII and other equipment, needed for the operation of the vehicle, as specified including expanded mode.

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ANNEX D

TRUCK, TRACTOR

D.1. Tractor. The MTV shall have a tractor model with and without winch which shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this annex.

D.2. General Requirements.

D.3. Specific Requirements.

D.3.1. Fifth Wheel. Vehicle shall be equipped with a full oscillating, 36-inch diameter sliding fifth wheel with forks and semi-automatic lock for SAE J700 2.0-inch kingpin. The fifth wheel jaws shall be self-adjusting to compensate for wear. The fifth wheel shall provide a minimum slide travel of 16.5 inches but not to exceed 17.5 inches and shall lock in forward and aft position of travel. The fifth wheel shall be capable of being uncoupled without the operator standing between the rear tandem tires. Uncoupling action shall be protected by a secondary manual lock, preventing uncoupling of the primary locking mechanism until the secondary lock is manually released.

D.3.1.1. Fifth Wheel Plate Assembly. The fifth wheel plate assembly shall provide 5° minimum full roll oscillation each side from the horizontal. The front articulation of the top plate shall provide a full pitch oscillation of 17° from the horizontal. The rear articulation of the top plate shall provide a minimum full oscillation of 20° and not to exceed 22° from the horizontal.

D.3.2. Fifth Wheel Location. During normal operation, the fifth wheel shall be located to provide clearance as follows: a. Swing clearance (from centerline of kingpin to rear tires and chassis frame rails) 70 inches (178 cm) maximum. b. Swing radius (from centerline of kingpin to rearpoint of obstruction (semitrailer nose to tractor components.)) 64 inches (163 cm) minimum.

D.3.3. Mounting. Fifth wheel mounting shall conform to Federal Motor Carrier Safety Regulation 393.70.

D.3.4. Approach Ramps. Approach ramps or plates of high tensile alloy steel (ASTM A572 Grade 60, equivalent strength, or higher) shall give support for fifth wheel forks and incline for semitrailer approach. The ramps or plates shall extend from the rear of the chassis frame to the fifth wheel forks. Approach ramps shall support and be compatible with the M871 semitrailer. The approach ramp shall be in a shape that shall pick up and vertically guide the kingpin to the fifth wheel forks.

D.3.5. Fifth Wheel Height, Load. Load level height of the fifth wheel shall be the minimum practicable consistent with the requirements of this specification. The fifth wheel shall safely accept loads up to 25,000 lb. (11,513 kg). In the most forward position, the fifth wheel shall be capable of withstanding a minimum static overturning moment of 82,500 lb-ft applied at right angles to the longitudinal axis of the fifth wheel without any deformation.

D.3.6. Deck Plate and Fenders. An open grating and quarter fender combination shall be provided as close behind the cab as possible, extend toward the rear of the vehicle and shall be as wide as the vehicle but not wider than 96 inches (244 cm). The grating shall extend across and be secured to frame rails with sufficient overhang to cover and protect any side-mounted tanks, power train components and fittings. The quarter fenders shall be provided ahead of and over the front wheels of the rear axle assembly to prevent road splash. The deck and fender

combination shall provide a maintenance platform capable of providing access to the semitrailer even with the tractor up to 20° off the semitrailer centerline and of sufficient strength to support two 95th percentile males in arctic clothing standing close together anywhere on the platform. Openings with covers shall be furnished for access for maintenance of fittings and other equipment under the platform. Provisions shall be made to allow access to personnel climbing onto the platform and for mounting removable safety rails on the outboard edge of the platform using 1 inch (2.5 cm) diameter supports. Walking areas of the platform shall be provided with a non-skid surface. The fender and grating shall not interfere with wheel/tire assembly removal and installation.

D.3.7. Hose Tender and Cable Supports. A pogo stick type hose tender with dummy gladhand connectors (to retain hoses when not in use) shall be provided in a convenient location to secure the trailer air hoses and electrical cables. The hose tender shall be mounted on the truck tractor deck plate or chassis members. Cable supports and stowage in accordance with standard commercial practice shall be provided.

D.3.8. Towed Vehicles. The truck tractor shall operate and be compatible with all semitrailers that the M931 and M932 truck tractors are capable of towing as listed below. Trailers are listed by common chassis family. In addition it shall be able to tow the LMTV & MTV military type trailers which are described in Annex J. The tractor shall be capable of towing fully loaded M871 semi-trailers.

M118A1 & M119A1(1)
M127A2, A2C, M128A2C, M129A2C & A4
M131A4, A4C, A5 & A5C
M146(1)(2)
M172 & A1
M269A1 & M270A1(3)
M295A1, M313, M447, C & M750(4)
M373A2 & A2C(5)
M822, M971, M991 & M995(6)
M871, A1, A2 & A3(7)
M967, A1, M969, A1 & A2(6)(7)
M970 & A1
M971(6)
M1005(6)
M1006
M1007(6)
M1008(6)
M1063
M1098(6)(7)
MILVAN, 40'(8)
SEGPRSM

(1) Tractor compatibility with the M118A1, M119A1, and the M146 is limited to highway only.

(2) It is permissible to tieback or remove landing pads for M146 trailers to provide additional clearance between the tractor and trailer.

(3) The NATO turning requirements does not apply to the M270A1 trailer due to the trailer's length.

(4) Requires that a king pin relocation kit be applied to the M295A1 trailer frame.

(5) Remove tractor mudflaps and add 6" pad under landing legs

(6) Remove tractor mudflaps

(7) Catwalk can be damaged if tractor is "racked"

(8) M1088/A1 tractor is not compatible with the 20' MILVAN

D.3.9. Trailers may have the landing legs supported as required to attain the proper engagement height with the tractor.Trailer Brake Control System (semitrailer). A complete semitrailer brake control system shall be furnished that includes the following:

a. Identification of emergency and service lines.

b. Prime mover protection valve with dash control and automatic breakaway feature.

c. Trailer stoplight operative with foot brake and with hand control for trailer brakes.

d. Two connecting air hoses adequate in length, equipped with coiled spring hose guards and gladhand connectors per SAE J318 on trailer end of hoses. Hoses shall reach from the tractor-mounted pogo stick to the applicable semitrailers and connect to the trailer brake system.

e. A wiring harness and connector to mate with the electrical system on the applicable semitrailers. The truck shall be equipped with one 24 volt 12-contact receptacle with cover and one 12 volt 7-contact receptacle with cover. The 12-contact connector shall conform to MS 75021-2 and be equipped with cover assembly conforming to Ordnance drawing 7731428. The 7-contact receptacle shall conform to SAE J560 round socket for jumper cable.

D.3.10. Work Lamps. The rear of the truck tractor shall be equipped with four 12 volt sealed beam work lamps as follows:

a. Lamps and mounting shall be in accordance with SAE J598.

b. Lamp housings shall be mounted on the rear of the vehicle in a protective location such that the work lamps are aimed 15 feet (4.5 m) from center of vehicle to illuminate the rear and side working areas.

c. Two of the lamps shall be detachable and provided with a 25 feet (7.5 m) cord to permit hand illumination of the truck pintle area.

Work lamps shall be not less than 4 inches (10 cm) in diameter, 1,500 candle-power and be provided with an on/off switch within the vehicle cab and marked to indicate the function of the switch. It shall be connected to an override system so they cannot be accidentally actuated when in the blackout mode.

D.4. Fifth Wheel Check. To determine conformance to para D.3.1 inclusive, the MTV tractor variant fifth wheel shall be checked for full oscillating, 36 inches diameter sliding fifth wheel, with forks and semi-automatic lock type conforming to the specified kingpin. The fifth wheel shall be examined to verify that slide travel is at least 16.5 inches and does not exceed 17.5 in. and locks in the forward and aft positions. The fifth wheel plate assembly shall be checked for 5° minimum full roll oscillation each side from the horizontal. Front articulation of the top plate shall provide a full pitch oscillation of 17° from the horizontal and rear articulation of the top plate shall provide a minimum full oscillation of 20 ° not exceed 22° from the horizontal. During Quality Conformance Inspections (para 4.4) the fifth wheel shall be coupled and uncoupled to verify that specified locking mechanisms meet the stated requirements.

D.4.1. Fifth Wheel Location Check. To determine conformance to para D.3.2, the MTV tractor variant shall be inspected for the clearances specified.

D.4.2. Mounting Certification. To determine conformance to para D.3.3, the contractor shall certify that the fifth wheel mounting conforms to Federal Motor Carrier Safety regulation, 393.70.

D.4.3. Approach Ramps Check. To determine conformance to para D.3.4, material certification shall be supplied to verify the high tensile alloy steel requirement. The vehicle shall be coupled to a fully loaded M871 semitrailer, operated and uncoupled. The ramps or plates shall be checked for all remaining requirements specified.

D.4.4. Fifth Wheel Height Load Check. To determine conformance to para D.3.5, a fifth wheel load of at least 25,000 lbs. shall be placed on the vehicle, and shall be checked periodically during government proving ground testing to detect any sign of overstress conditions (cracks, weld breaks, misalignment, etc.).

D.4.5. Deck Plate and Fenders Check. To determine conformance to para D.3.6, the vehicle shall be checked for the specified requirements. The vehicle deck plate and fenders shall be periodically checked during government proving ground testing for continued compliance to the specified requirements.

D.4.6. Hose Tender and Cable Supports Check. To determine conformance to para D.3.7, the vehicle shall be checked for the specified equipment and requirements.

D.4.7. Towed Vehicles Check. To determine conformance to para D.3.8, the MTV tractor variant shall demonstrate the capability of towing each semi-trailer specified.

D.4.8. Trailer Brake Control System (Semitrailer) Check/Test. To determine conformance to para D.3.9, the vehicle's emergency and service lines shall be checked for proper identification. The prime mover protection valve shall be tested, during Government proving ground testing, for dash control and automatic breakaway features. The trailer stoplight shall be checked for operation by using trailer foot brake and hand brake controls. The two connecting air hoses shall be checked for adequate length, before and after operations, at Government proving ground testing, with each trailer type, by examining for pinching, stretching, fraying, connecting, disconnecting, or indication of improper length. The hoses shall be checked for coil spring guards and glad hand quick connectors, conforming to SAE J318, on trailer end of hoses. During tests at a Government proving ground, the vehicle, while towing each trailer, shall be inspected before, during, and upon completion for proper length and operation of the hoses. The wiring harness shall be inspected for the requirements specified.

D.4.9. Work Lamps Check. To determine conformance to para D.3.10, the vehicle work lamps shall be check/inspected for the specified requirements.

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SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX E

TRUCK, WRECKER

E.1. General Requirements. The MTV shall have a wrecker model which shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this Annex.

E.2. Specific Requirements.

E.2.1. Operations. The wrecker shall be capable of multipurpose operations by a single individual as follows:

a. a. Recovery (Winching/Lift Towing/Towing) as described below.

b. b. Removal and installation of power packs (without use of outriggers) from wheeled vehicles listed in E.2.2. In addition, the wrecker shall be capable of moving 3 mph (5 km/h) or less forward or backward a distance of 200 meters with any of the power packs up to 5,000 lb. (2,268 kg) suspended and place them on the ground, platform trailers (i.e., M127, M871, M872, etc.) and cargo trucks (i.e., M939 series, MTV series, etc.) and traverse the crane with the above loads with the outriggers in place.

c. c. Load and unload engine/transmission containers with weights up to 11,000 lb. (4,990 kg) from the cargo trucks listed below and M127, M871 and M872 semitrailers.

E.2.2. Winching. The wrecker vehicle shall be capable of winching immobile, mired, loaded vehicles with their associated trailers from the 1/4 ton truck to a fully loaded MTV and M939 series 5-ton truck, up to the capacity of the main recovery system. Vehicles shall include 1/4 ton M151, HMMWV M998 series, CUCV M1008 series, 2-1/2 ton M35 series, 5-ton M809 and M939 series, LMTV and MTV series vehicles. The wrecker shall be capable of recovering loaded vehicles listed above with the main recovery winch cables deployed at a sideward angle of up to 32° from the vehicle longitudinal centerline and at a downward angle of up to 23° from the vehicle horizontal centerline. The main recovery winches shall be rear mounted. The wrecker shall also be provided with the self recovery winch as specified.

E.2.3. Lift/Towing Device. The wrecker shall have a lift/towing device which shall be capable of performing lifting and towing as specified herein.

E.2.3.1. Lift/Towing. The wrecker shall lift and tow vehicles as specified below without damage or permanent deformation to wrecker or towed vehicle. The lifting system shall be rigid for towing purposes. The wrecker shall be capable of hookup, lifting and towing over its mission profile.

a. From the front, all FMTV vehicles and other vehicles listed in E.2.2 and loaded to the GVW of the heaviest FMTV model at highway speeds up to 35 mph (56 km/h) and off road speeds to 15 mph (24 km/h).

b. From the rear, all vehicles in a. above, except the M1089/A1, (at rear weight not exceeding front lift of fully loaded FMTV).

c. From the front, (tow only) any of the vehicles in a. above with trailers/semitrailers attached (up to GCW of heaviest FMTV model) on relatively level hard surfaced roads at speeds up to 24 mph (39 km/h).

d. The wrecker type shall have the capability to tow all specified vehicles with all tires of the towed vehicle on the ground.

E.2.3.2. Material Handling. The vehicle shall include a fully hydraulic constant torque crane powered by the vehicle's hydraulic system. The crane shall be operated by controls at the side of the vehicle and a single multi-function waterproof remote control which shall be provided. Both controls shall be proportionally variable. The crane for road and air transport shall not exceed 96 inches (244 cm) width nor extend rearward beyond the chassis frame. The crane assembly with mounting hardware shall not experience maximum unit stress beyond margins of safety provided in SAE J1063 when tested accordingly. Crane design shall provide for smooth and quiet operations, ease and flexibility, and versatility of performance. If fixed boom, crane shall comply with ANSI/ASME B30.5. A flexible/swiveling 1 foot (31 cm) minimum interface between boom and hook shall be provided to facilitate attachment of load without precise positioning of the boom. Vertical lift of load is required. Crane shall be fully operable without movement of other vehicle assemblies. Boom shall have a fixed location for stowage of the hook assembly. The load hook assembly shall be precluded from contacting the upper pulley (Anti-two blocking). The crane shall withstand 60,000 full operation cycles at maximum working load without structural fatigue failure.

E.2.3.2.1. Location and Capacity. The crane shall have a minimum working traverse of 270° centered over the vehicle rear with a rated capacity of 125% of static capacity at inner and outermost reach. The crane shall be capable of performing all lifting functions as required by specification. Crane radius of operation is defined as the distance from the center of rotation to the center of the boom sheave. Crane shall have the following lift and reach capabilities:

a. Lift 5,000 lb. (2,268 kg) at 5 feet (153 cm) from the rear of the pintle with the bottom of the lift hook located no less than 10 ft (3m) from the ground directly behind the vehicle (without outriggers).

b. Lift standard shelters to and from FMTV cargo vehicles at loads up to 5,000 lbs (2,268 kg) without boom brace supports.

c. Lift 10,000 lb. (4,536 kg) at 10 feet (3 m) from vehicle with bottom of lift hook located no less than 12 feet (4 m) from the ground with outriggers (without boom brace supports).

d. The crane boom shall have the capability to retract to a location not extending beyond the wrecker body.

e. If the MHE is utilized during lift/tow operations, a maximum height of 12 feet (4 m) as measured from the ground shall not be exceeded.

f. The crane shall be capable of self-loading any Basic Issue Items (BII) weighing over 100 lb. (45 kg).

E.2.3.2.2. Stabilizing System. Outriggers shall be fully hydraulically operated and mounted directly to the crane base or vehicle frame. Outrigger beams shall be positively retained in the stowed position. Outrigger legs shall be independently hydraulically controlled for leveling. The outrigger legs shall lock in place when extended to stabilize the vehicle at all times and shall have no more than 1 inch (2.5 cm) creep in 30 minutes. Outrigger legs shall not protrude into the plane of the departure angle when stowed. Outrigger pads shall be retained on the legs by a quick disconnect pin if pad is normally removed during travel. The stabilization system shall stabilize the wrecker with tires at highway pressure, crane at maximum capacity with tipping moment within 85% of the system righting moment when tested in accordance with SAE J765 except that the test shall be conducted on a 7% lateral slope. Stabilizing system safety requirements shall be in accordance with ANSI/ASME B30.5. The holding pads shall hold and stabilize the crane at maximum load on level ground with soil strength conditions 60 Rating Cone Index (RCI) as measured at the 6 to 12 inches (15-30 cm) soil layer depth.

E.2.3.2.3. Crane Hydraulic System and Controls. Integrated within the hydraulic system shall be the necessary hydraulic cylinder(s), strainer(s), filter(s), reservoir(s), pressure relief valve(s), and all necessary lines, lockout(s), restrictor(s), and control valve(s) to insure positive and safe control of all operations and to provide protection in the event of a hydraulic power failure. Hydraulic filters and strainers shall be located to allow direct access and removal without causing damage to the vehicle. Bypasses shall exist where necessary to protect filters during cold temperature operation. A means shall be provided for bleeding all air trapped in the hydraulic system. A means shall be provided to lower any load to the ground in the event of a hydraulic system or control failure. Cylinder rods exposed during operations shall have a hard chromium plating with a crack-free thickness sufficient to pass the porosity test of SAE-AMS-QQ-C-320. All high-pressure hydraulic hoses and fittings shall be capable of withstanding a bursting test pressure of four times the working pressure and proof pressure of two times the working pressure. High-pressure hydraulic hoses shall be capable of operation on OE-10, OE/400/-10, Grade 10 oil conforming to MIL-PRF-2104, and OEA under Arctic Conditions. There shall be no leakage of hydraulic fluid past couplings or seals at maximum load and speed within the operational conditions cited herein. The crane shall maintain vertical downward creep not to exceed 1 inch (2.5 cm) thirty (30) minutes after stabilization with maximum load at maximum lift radius. Directional control valves shall permit operating a minimum of two functions simultaneously. The crane control actuation directions shall comply with Table E-I (as applicable):

TABLE E-I

CONTROL

Crane Action	Vertically Mounted	Horizontally Mounted
Boom Up	Move Knob Up	Toward Operator
Boom Down	Move Knob Down	Away From Operator
Boom Extension In	Move Knob Down	Away From Operator
Boom Extension Out	Move Knob Up	Toward Operator
Crane Winch Up	Move Knob Up	Toward Operator
Crane Winch Down	Move Knob Down	Away From Operator
Crane Winch CW	Move Knob Up	Toward Operator
Crane Winch CCW	Move Knob Down	Away From Operator
Crane Mast Down	Move Knob Down	Away From Operator
Crane Mast Up	Move Knob Up	Toward Operator
Outrigger Pad Up	Move Knob Up	Toward Operator
Outrigger Pad Down	Move Knob Down	Away From Operator

The above Table does not define the required mounted position or location. The vertical and horizontal nomenclature refers to the direction of control knob movement.

E.2.3.3. Fixed Operator's Station. All Lift/Tow, Recovery Winch and Recovery anchor controls and indicators shall be located within clear view and easy reach of the operator in the fixed operator's station and shall be readily accessible under all conditions of operation. The lift and main recovery winch system fixed controls shall be located such that both the lift/towing device and main recovery winch system may be operated simultaneously from the same station. The controls for the main recovery winch system shall be such that the winch(es) can be operated independently and simultaneously. Each functional control, both lift, outrigger and main recovery winch shall be of the deadman type which shall automatically return to the neutral position should the operator inadvertently or intentionally release the control. All controls governing a function (rotation, boom extension and retraction, vertical lift and drop) shall be of the proportionally variable types if utilized for material handling. Controls shall be clearly marked as to the use and function. Control spacing and size shall be such that an operator wearing arctic mittens shall be able to operate the controls. Controls shall be waterproof and performance shall not be diminished when

tested in accordance with MIL-STD-810 Method 506.2 Procedure 1. Controls shall be protected from weather and accidental damage in accordance with good commercial practice.

E.2.3.4. Remote Control. A separate remote control unit shall be provided integrating both the lifting device and main recovery winch controls. Another remote control unit for the crane shall be provided. Both remote control units shall operate the spools of the corresponding directional control valves. The crane remote control shall be proportionally variable. Both remote controls shall be provided with an emergency shutdown capability and designed such that when activated all functions cease. Both remote controls shall be waterproof, and performance shall not be diminished when tested in accordance with MIL-STD-810, Method 506.4, Procedure 1, and shock resistant IAW MIL-STD-810 (Method 516.5), Procedure IV. The crane operator shall be able to operate the crane remote at either side of the wrecker. The crane remote control and the wrecker winch/lift tow remote control shall not be capable of simultaneous operation. The remote control for the main recovery winch system shall be such that the winch(es) can be operated independently and simultaneously. One remote station for each remote control is required on each side of the vehicle. Each remote control unit with a 50 feet cable is required to be furnished with each wrecker vehicle, including lockable, waterproof, shock absorbing storage space for the units. Each remote control box weight shall not exceed 10 lbs (4.5 kg) and shall be designed in accordance with MIL-STD-1472. A shoulder strap shall be provided with each remote control box. The controls shall have multiple functions to match the control levers on the fixed controls except the outrigger controls, the free spool function and the recovery anchor control.

E.2.3.5. Transportability. The crane must meet all FMTV transportability requirements without preparation.

E.2.3.6. Overload Shutdown System. The crane shall be provided with an overload shutdown which shall preclude structurally overloading the crane. The system shall initiate shutdown of the crane's functions, except for functions which would reduce or alleviate the overload condition when any crane movement causes the moment on the crane to exceed 110% of the crane's rated capacity. Shutdown shall be completed within a period of time such that a load exceeding 110% of the crane's rated capacity cannot be lifted to a height of more than 12 inches above ground level when lifted at maximum winch speed. Loads of 150% of the crane's rated capacity shall not leave the ground.

E.2.3.6.1. FMTV Boom Extension Indicator. A boom extension indicator shall be provided which shall be visible from both sides and shall indicate the boom's extension from minimum retraction to maximum extension. Each boom section shall be marked at one (1) foot, maximum intervals. Marking shall be lusterless black color #37030, or lusterless green 383 color #34094 if placement of marking is in a black area of the camouflage.

E.2.3.7. Line Load Winch. The crane shall provide vertical lift using one control. If utilized, the line load winch shall not prevent the crane from folding into the stowed position, moreover, while in the stowed position the crane shall meet all requirements in this FMTV specification. The winch shall have the capacity of lowering or raising a 11,000 lb. load at a speed of not less than 3 feet/min (1 m/min) and shall comply with ASME B30.5. The crane manufacturer shall supply 50 feet (15 m) of non-twist wire rope with a safety factor of not less than 350% of the rated capacity of the winch. The pitch diameter of the drum or sheave(s) shall not be less than 18 times the diameter of the rope used. No less than two full wraps of rope shall remain on the hook line drum when the hook is in its extreme low position with the boom at maximum extension in the most upright position. The winch shall be operable by either the fixed or the remote controls for the crane. The winch shall have a braking system for lowering in accordance with ASME B30.5. Cable shall be wrapped evenly and tightly over the width of the spool while winching in or out from zero to maximum rated load. This distribution shall not interfere with the winching speed (in or out) of the cable.

E.2.4. Hydraulic Reservoir. The vehicle shall be provided with a hydraulic reservoir, of capacity recommended by the manufacturer of the ancillary hydraulic equipment and capable of withstanding the shock and

vibration of the off highway travel delineated in the mission profile (Table V). As a minimum the reservoir shall be provided with the following:

a. Filter(s), readily accessible for cleaning or replacement without draining the reservoir in all hydraulic circuits in accordance with recommendations from hydraulic component suppliers. Bypasses shall be furnished where necessary to protect filters during cold temperature operation.

b. Baffles to preclude foaming.

c. Externally mounted sight gage (with fill and full marks) readily visible from the ground, and sealed filler cap. Reservoir shall be vented in a fashion to preclude entry of contaminants to include water during fording.

d. Clean-out port adequate in size to manually clean reservoir.

e. Hydraulic fluid conforming to MIL-PRF-2104, OE-10, OE/400-10, Grade 10 or OEA (arctic) to meet climate operating requirements.

E.2.5. Signs and Markings.

a. Crane Instruction Plate. The crane operating instruction plates shall be furnished according to A-A-50271 Composition A, Class II. One plate installed at the fixed control station and appropriate instructions shall also be placed on the remote control unit.

b. Outrigger Leg Sign. A sign, IAW with A-A-50271 composition A, Class II, 1-inch lettering , directly visible from the control station stating: OUTRIGGER BEAMS MUST BE FULLY EXTENDED AND OUTRIGGER LEGS IN PLACE FOR ALL LIFT OPERATIONS EXCEPT THOSE BEHIND THE TRUCK.

c. Load Capacity Sign. Load capacity sign directly visible from the control station stating the capacity as designated shall be IAW A-A-50271 Composition A, Class II.

d. Boom Angle Indicator. A boom angle indicator shall be provided visible from both sides which shall indicate the boom angle from maximum elevation to maximum depression relative to horizontal and marked in 5° increments with 0° correlating to horizontal. The boom angle indicator shall show a direct correlation to the crane load capacity sign para E.3.5c.

E.2.6. Main Recovery Winch System. The vehicle shall have a main hydraulic winch system consisting of two winches each with a minimum bottom layer rating single line pull capability of 30,000 lb. (13,600 kg) +/-10%, per SAE J706 and no less than 50% of that capability at top layer line pull. The rating shall be established on the basis of cable deployment horizontally rearward on the longitudinal centerline of the vehicle. The winches shall be driven by a hydraulic motor mounted directly on each winch. The winches shall have a two speed or variable speed capability (within the two speed range). The low speed at ambient fluid temperature shall not be less than 15 feet/min (4.5 m/min) at full load on the first layer of the winch drum. The no-load high speed shall be at least twice as fast as the low speed. The winch system shall be designed to minimize damage to the winch cable and insure uniform level winding of the winch cable onto the winch drum. The main recovery winches shall have the capability of free spooling without cable backlash while paying out the cable by a single operator. The system shall be equipped with devices to ensure and assist in receiving of the cable properly and to allow for sideward and downward pulling. There shall be 100 to 110 yards (91-101m) of usable wire rope in continuous length beyond the rear of the vehicle without a splice joint, with a safety factor of at least 2:1 above the maximum line pull capacity after 10 maximum load pulls. The end of each wire rope shall be equipped with clevis. All exposed, moving, reciprocating, and rotating power transmission devices shall be guarded to the maximum extent practicable. The winches must be mounted on the vehicle in such a way that they can withstand full capacity pulls without damage to

the vehicle frame or components. The winch design shall be made in compliance with SAE J706. The maximum operational rating shall be such that one full length line pull can be accomplished in the low speed ratio at top layer line pull rating at 120°F ambient without exceeding a lube temperature of 250°F. The power take-off shall be of a capacity to operate the winch at full load in low speed. The winch system shall be protected with a pressure relief device set to prevent damage to any of the winching system components during a simultaneous maximum line pull horizontally rearward on the longitudinal centerline of the vehicle.

E.2.7. Recovery Anchors. Hydraulically deployable ground chocks/spades (anchors) with inherent anchoring capability up to the capacity of the main recovery winch in soil strength conditions of a minimum 60 Rating Cone Index (RCI) as measured at the 6 to 12 inches (15-30 cm) soil layer depth at any winch angle shall be provided. The recovery anchors maybe utilized for stabilization assistance.

E.2.8. Hydraulic System. The vehicle hydraulic system shall:

a. Be capable of operating all vehicle-mounted hydraulically-powered equipment for a period of not less than 60 minutes continuously without regard for ambient temperature.

b. Be capable of operating all hydraulic equipment mounted on a similar vehicle.

c. Be capable of operating other hydraulic ancillary equipment external to the vehicle.

d. Be capable of operating while hydraulically powered from another vehicle.

e. Be capable at the rear of the truck of powering a 3/4-inch hydraulic impact wrench.

These provisions shall be integrated such that any of the vehicle-mounted hydraulic equipment required can be operated from an external power source. Removable caps or plugs which are captively retained shall be installed at the points of attachment of the external hydraulic system to prevent dirt or other foreign matter from contaminating the system.

E.2.9. Work Lamps. The rear of each wrecker shall be equipped with four 12 volt sealed beam work lamps as follows:

a. Lamps and mounting shall be in accordance with SAE J598.

b. Lamp housings shall be mounted in protected positions and such that the lamps are aimed at areas around the rear and sides of the vehicle. And be adjustable such that all MHE lift areas may be illuminated.

c. Two lamps shall be detachable and each provided with a 35 feet (11m) cable

d. The work lamps shall not be less than 4 inches (10 cm) in diameter and 1,500 candle power and be provided with an individual on/off switch plus a single master switch in the vehicle accessible to the driver and shall require positive override action to activate when vehicle is in blackout mode.

E.2.10. Other Equipment. The vehicle shall be equipped with all items necessary to accomplish recovery, retrieval, maintenance supply support missions.

E.2.10.1. E.2.10.1 Basic Issue Items (BII). There shall be provisions for mounting or storage of BII and securing the BII in such a manner as to deter pilferage. Wrecker's BII listed in drawings 12378420-003 and 12378411-005 shall be supplied by the contractor.

E.3. RESERVED.

E.4. Operations Check. To determine conformance to para E.2.1, the wrecker shall be operated by a single individual during testing at a Government proving ground for recovery of the specified vehicles, for removal and installation of the specified power packs, and for loading and unloading the specified containers.

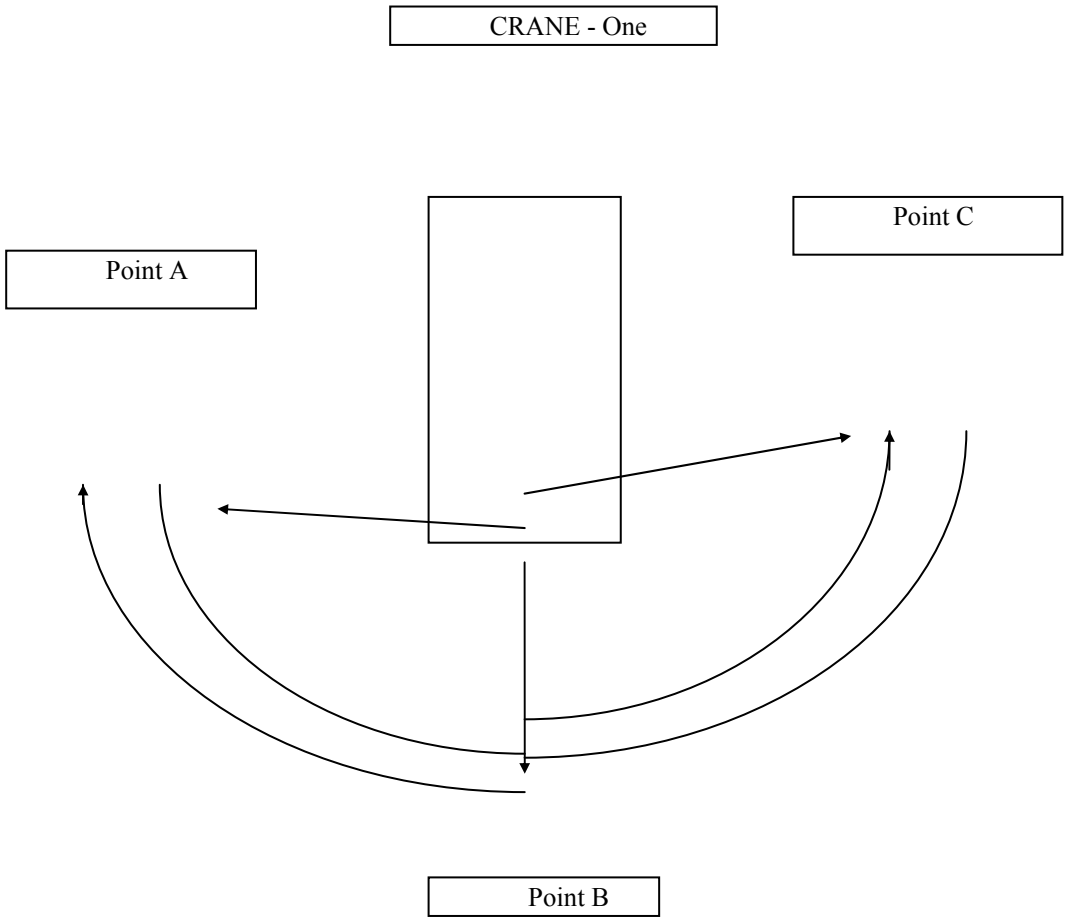
E.4.1. Winching Check. To determine conformance to para E.2.2, the wrecker shall demonstrate winching capabilities to the requirements specified.

E.4.2. Lifting/Towing Test. To determine conformance to para E.2.3.1, the wrecker, at a government proving ground, shall demonstrate towing and lifting capabilities as specified. During QCI and Control Test, another vehicle shall be hooked to the wrecker stinger. The vehicle shall be raised from the ground to the tow position five (5) times.

E.4.3. Material Handling Check/Test/Certification. To determine conformance to para E.2.3.2 (inclusive), the wrecker crane shall be checked for the specified controls, dimensions, markings, etc. Each crane shall be tested for the specified operation and to the margin of safety provided in SAE J1063. The contractor shall certify that the safety factor is equal to, or greater, than that provided in SAE J1063, and if fixed boom, certify to ASME B30.5. The crane shall be checked/inspected for location as specified. During Control Tests (para 4.5), the crane shall be tested for the minimum lift capabilities, stabilization control operation (station and remote), height, overload shutdown, and winch line load capabilities.

E.4.3.1. Location and Capacity Check/Test (Crane). To determine conformance to para E.2.3.2.1, visual and functional inspection and testing shall assure the crane has minimum working traverse of 270° when centered over rear of vehicle, and that the crane has a rated capacity of l25% of static capacity at inner and outermost reach. The crane shall be capable of performing all lifting functions as required by para E.2.3.2.1 (crane radius of operation is defined as the distance from the center of rotation to the center of the boom sheave). Crane shall be tested for the following lift and reach capabilities: (a) Lift 5,000 lbs. at 5 feet from the rear of the pintle with the bottom of the lift hook located no less than 10 feet from the ground directly behind the vehicle (without outriggers). (b) Lift standard shelters from cargo vehicles to ground and ground to vehicle, with outriggers (without boom brace supports). (c) Lift 10,000 lbs. at 10 feet from crane center of rotation with bottom of lift hook located no less than 12 feet from the ground, with outriggers (without boom brace support). (d) The crane boom shall have the capability to retract to a location not extending beyond the wrecker body. (e) If the MHE is utilized during lift/tow operations, a maximum height of 12 feet, as measured from the ground, shall not be exceeded. (f) The crane shall be capable of self-loading any Basic Issue Items (BII) weighing over 100 lbs. Check for malfunctions, misalignments, clearances, etc.

During QCI, the contractor shall perform 10 cycles with a 5,000 lb. simulated load. See the diagram of one cycle below:



The load shall be raised and lowered a minimum of 5 feet at points A, B, and C of the crane cycle. For the control test, 40 crane cycles at 5,000 lbs shall be performed. Both the remote and fixed operator's station shall be used during QCI and Control Testing. The crane and vehicle hydraulic systems shall be inspected for leaks, chaffing, and proper operation of the controls during this testing. The cable shall be inspected for kinks, twists, birds nest, proper spooling, and other defects caused by improperly spooled cable.

E.4.3.1.1. Load Test. In addition to all other required inspections and tests, the contractor shall perform load testing of MHE/MHC on all vehicles produced IAW IETM 9-2320-392-34 using the latest version. Specifically, Direct Support Maintenance Procedures titled Crane Load Test, paragraphs titled Static Overload Test (12,100 lbs.) and Dynamic Test (10,000 lbs.) shall be performed. Paragraph titled Static Overload Proof Test DOES NOT apply.

E.4.3.1.2. FIR Incorporation. The required Load Test shall become part of QCI and incorporated into the government Final Inspection Record (FIR) as it applies to variants with MHE/MHC.

E.4.3.1.3. Marking/Stenciling. The load rating and date of next periodic inspection (1 year from date of performing load test) shall be stenciled on crane booms. The stencil shall be of sufficient size and location so it will be clearly visible by the operator from the ground and operator's position.

E.4.3.1.4. Certification. The contractor shall certify performance of load test by annotating the DA Form 2408-9, which accompanies each vehicle, with the following statement in the remarks section: "Certify crane load test performed on (date) IAW TB 43-0142 and vehicle TMs".

E.4.3.2. Stabilizing System Check/Test (Outriggers). To determine conformance to para E.2.3.2.2, testing at a Government proving ground shall be conducted with the fully hydraulically operated outrigger mounted to the crane base or vehicle frame. Testing of the following characteristics and working conditions shall be conducted: Outrigger beams shall be positively retained in the stowed position. Legs shall be independently hydraulically controlled for leveling, and shall lock in place when extended to stabilize the vehicle at all times. No more than 1 inch creep in 30 minutes is allowed. Outrigger legs shall not protrude into the plane of the departure angle when stowed. Pads shall be retained on the legs by a quick disconnect pin if pad is normally removed during travel. The stabilization system shall be sufficient to stabilize an unloaded truck, with tires at highway pressure, crane at maximum capacity, with tipping moment within 85% of the system righting moment. Test shall be in accordance with SAE J765, except that the test shall be conducted on a 7% lateral slope. Stabilizing system safety requirements shall be in accordance with ANSI/ASME B30.5. The holding pads shall hold and stabilize the crane at maximum load on level ground with soil strength conditions 60 Rating Cone Index (RCI), as measured at the 6-12 inch soil layer depth.

E.4.3.3. Crane Hydraulic System and Controls Checks/Tests/Inspections. To determine conformance to para E.2.3.2.3, check/tests shall assure that all hydraulic systems operate in a positive and safe manner, and that adequate protections are built into the systems and controls to provide protection in the event of a hydraulic power failure. Check/test for malfunctions, leaks, or damage in the following areas: cylinder(s), strainer(s), filter(s), reservoir(s), pressure relief valve(s), and all necessary lines, lockout(s), restrictor(s), and control valve(s). Check that hydraulic filters and strainers are located to allow direct access and removal without causing damage to the vehicle, that by-passes exist where necessary to protect filters during cold temperature operation, and that a means is provided to lower any load to the ground in case of power or control failure. Contractor shall assure cylinder rods exposed during operations shall have a hard chromium plating, with crack-free thickness sufficient to pass porosity test, QQ-C-320. High-pressure hydraulic hoses and fittings shall be capable of withstanding a bursting test pressure of four times the working pressure, and proof pressure of two times the working pressure. High-pressure hydraulic hoses shall be capable of operation using OE-l0, OE/400/-l0, Grade l0 oil, conforming to MIL-L-2l04, and OEA, under Arctic conditions. Operating under those conditions, no leakage of hydraulic fluid past couplings or seals at maximum load and speed is allowed. The crane shall maintain vertical downward creep not to exceed one inch in thirty minutes after stabilization, with maximum load at maximum lift radius. Directional control valves shall permit operating a minimum of two functions simultaneously. The crane control actuation directions shall comply with Table E-I (as applicable).

E.4.4. Fixed Operator's Station Check/Test. To determine conformance to para E.2.3.3, the crane and main recovery winch system shall be operated by a single individual, wearing arctic mittens, at the fixed operator's station, during testing at a Government proving ground for specified requirements and independent and simultaneous operation of controls. The controls shall be checked for "deadman" type. All functional controls shall be checked for proportional variation. The controls shall be tested in accordance with MIL-STD-810, Method 506.4, Procedure 1, during testing at a Government proving ground.

E.4.5. Remote Control Check Test/Certification. To determine conformance to para E.2.3.4, during testing at a Government proving ground, the remote controls shall be tested in accordance with MIL-STD-810, Method 506.4, Procedure 1; MIL-STD-810, Method 516.5 Procedure IV, and control operation as specified. The remote controls shall be checked for location, 50 feet cables, specified storage space, remote control box weight, and remote control box shoulder strap. Prior to First Production Vehicle Inspection (para 4.3.1), the contractor shall certify that the remote control meets the HAEMP and EMI requirements specified, per MIL-STD-46lE, Part 8, Group II.

E.4.6. Transportability Test. To determine conformance to para E.2.3.5, the crane, during testing at Government proving ground, shall be tested to all transportability requirements of the FMTV specification, without preparation.

E.4.7. Overload Shutdown System Test. To determine conformance to para E.2.3.6, the crane overload system shall be tested for the specified shutdown functions and operations.

E.4.8. Line Load Winch Test/Certification. To determine conformance to para E.2.3.7, winch and wire rope shall be tested with load and examined for proper assembly, installation and functional requirements. The crane shall be checked for specified requirement. Rated load of the winch system shall be tested at a Government proving ground. During control test at a contractor's facility, winch and wire rope shall be tested and examined, as above. The test shall be conducted utilizing a load cell. All hydraulic pressure adjustments that affect crane winch performance shall be tested and recorded prior to vehicle shipment. The certification shall address all requirements of annex E that will allow the user to immediately use the crane without additional testing upon receipt. The contractor shall certify that the safety factor on the winch wire rope is not less than 350% above the rated capacity of the winch, and that the winch braking system, for lowering, is in accordance with ASME B30.5.

E.4.9. Hydraulic Reservoir Test. To determine conformance to para E.2.4, the hydraulic reservoir shall be examined to assure the system meets the requirements stated. During tests at a Government proving ground, the reservoir shall be monitored for proper operation, faulty lubrication, overheating, leakage, or any other detrimental malfunctions.

E.4.10. Signs and Markings Check. To determine conformance to para E.2.5, the wrecker shall be checked for all instruction plates, signs, markings, and angle indicator requirements.

E.4.11. Main Recovery Winch System Test/Check Certification. To determine conformance to para E.2.6, during Control Tests (para 4.5) the main winch system shall be tested for the specified operations and specified rated pull capacity. After testing, the winch shall be examined for damage and the cable checked for fraying. During Quality Conformance Inspection (para 4.4), the winch shall be checked for proper assembly, installation, length of cable (at least 108 yards), cable type (no splice joints and equipped with clevis end), and tested pulling an unloaded vehicle on a hard level surface. The winch drum diameter shall be checked for the diameter requirement specified. The contractor shall certify the wire rope has a safety factor of at least 2:1 above the maximum line pull capacity after 10 maximum load pulls in a clean environment, 5 pulls longitudinal to vehicle, and 5 pulls at 32° from centerline in a horizontal plane. The certification including test results shall be provided with each wrecker for both winches. The certification shall address all requirements of paragraph E.2.2 to allow the user to immediately use the winch without additional testing upon fielding. The contractor shall assure that the winch cable is properly wound, free of corrosion, bird nesting, twist, kinks and other defects caused by an improperly spooled cable.

E.4.12. Recovery Anchors Test. To determine conformance to para E.2.7, the recovery anchors shall be tested during testing of the main recovery winch at a Government proving ground for the requirements specified.

E.4.13. Hydraulic System Check/Test. To determine conformance to para E.2.8, the vehicle hydraulic system shall be operated and monitored for not less than one (1) hour during testing at government proving grounds. The hydraulic system shall be checked for proper assembly, installation, absence of leaks, ports for connecting external ancillary equipment, ports for connecting a similar vehicle for operation, ports for being operated by the hydraulic system of another vehicle or by a pump mounted at the PTO opening and all ports plugged or capped.

E.4.14. Work Lamps Check/Test. To determine conformance to para E.2.9, the vehicle shall be checked for the lamps specified at the locations specified. Lamps shall be tested at a Government proving ground for requirements specified.

E.4.15. Other Equipment Check. To determine conformance to para E.2.10 (inclusive), the vehicle shall be checked for the specified additional equipment, Basic Issue Items, mounts, and/or lockable stowage provisions.

ANNEX F

MTV CHASSIS

F.1. Chassis. MTV chassis shall be available as described herein.

F.2. General Requirements. Standard and long wheelbase Cargo chassis utilized in constructing a model of the MTV shall be available without body.

F.3. Specific Requirements. The chassis shall be used to mount special purpose equipment such as ribbon bridge transporter, maintenance contact units, mobile decontamination units, generator sets.

F.4. General Requirements Check. To determine conformance to para F.2, each version of the MTV chassis shall be checked to verify it can be obtained without body.

F.4.1. Specific Requirements. To determine conformance to para F.3, the MTV chassis shall be checked for the mounting requirements specified. The contractor shall supply design concept drawings not later than 90 days prior to First Production Vehicle Inspection (para 4.3.1), showing design considerations for mounting of the special purpose units specified.

ATPD 2131C, DATED 20 Feb 03
SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX G

LMTV TRUCKS, CARGO

G.1. Cargo. The LMTV shall have a cargo truck model with and without winch which shall meet all of the requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this annex.

G.2. General Requirements. The cargo truck shall have a minimum internal bed length of 147 inches (373 cm) and minimum usable width (with sides up and troop seat kits removed) of 90 inches (229 cm) and a usable width of not more than 96 inches (244 cm) with sides removed. Bed sides shall be configured so that they pivot outward to a vertically locked down position (96 inches width restriction waived for this requirement only), and shall be removable by two people without use of tools. Removable components shall have recesses or specific handles to facilitate removal and handling. Storage space shall be provided, which does not infringe upon the bed area, for dropsides and posts when not in use. The cargo bed shall accept at all locations, with covering kit installed, loads up to 54 inches (137 cm) in height. Bed sides shall be a minimum of 18 inches (45 cm) above the floor of the cargo bed and be capable of withstanding lateral and longitudinal load forces as exerted by a 2,500 lb (1,089 kg) pallet. The LMTV shall have provisions on all cargo models for accepting a hand/electrically operated, side mounted crane capable of loading/unloading a 1,500 lb (653 kg) pallet from ground level to the cargo deck with vehicle on slopes up to 7%. The crane kit shall be detachable and capable of being placed in 4 locations within the cargo bed, within the general area of each corner, by 2 crew members within 15 minutes without special tools. An ingress / egress ladder shall be provided for the cargo bed, as part of tailgate or with mating slots at both rear corners of the cargo bed at the manufacturer's option. Ladder shall reach to the ground when the truck is parked on level concrete. The rearmost cargo bed side wall posts shall each incorporate a handle for ease of ingress/egress. Tailgate and cargo bed shall include sufficient hinging so the loss of one hinge does not render the tailgate and cargo bed unsafe to use.

G.2.1. Cargo Bed Tiedowns. The cargo body shall have tiedowns, conforming to MIL-STD-209H except the cargo tiedown locations shall be in accordance with the technical data package provided with this solicitation. Tiedowns shall swivel 360^{o} and shall not protrude above the floor or side wall level when they are not in use. The rings must be accessible when the drop sides are in a raised position. No portion of the bed shall fail when maximum rated load is placed on any opposing tiedowns.

G.3. RESERVED.

G.4. General Requirements Check. To determine conformance to para G.2, the LMTV cargo truck shall be checked for compliance to the requirements specified.

G.4.1. Cargo Bed Tiedowns Test. To determine conformance to para G.2.1, the LMTV cargo variant shall be inspected for location and 360° operation of tiedowns, in accordance with specified requirements. Tiedowns shall be tested, in vehicle, to the minimum rated strength, without deformation of the tiedown or attachment members. Inspection certification that the cargo tiedowns meet the requirements of MIL-STD-209H shall be provided.

ATPD 2131C, DATED 20 Feb 03
SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX H

LMTV VAN

H.1. Van. The LMTV shall have a van model with and without winch which shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this Annex.

H.2. General Requirements.

H.2.1. Standard Van. This model shall be used as a shop van, which shall utilize the same chassis as the rest of the LMTV fleet.

H.3. Special Requirements. The following specialty requirements are considered essential for the LMTV van model:

H.3.1. Van Body.

H.3.1.1. Dimensions.

Length: The internal length of the LMTV Van body shall be at least 12 feet (366 cm).

Width: The internal width of the LMTV Van body shall be at least 90 inches (228 cm). The overall width of the LMTV Van body shall not exceed 96 inches (244 cm).

Height: The internal height of the LMTV Van body shall be at least 78 inches (198 cm). The overall height of the LMTV van shall not exceed 144 inches (366 cm).

H.3.1.2. Transportability. The van body shall be transportable as specified in the main body of the FMTV specification. The body shall have lifting provisions which allow for the installation and removal of the body to and from the chassis if necessary for rail, C130 and C141 transport. Lifting requirements shall be as defined in the main body of the FMTV specification. The van body shall be capable of being completely removed or installed (ready for road operation) on the chassis, by two people (vehicle operators) and crane operator within 60 minutes, in order to meet air transport requirements.

H.3.1.3. Waterproofness. Van bodies and all components shall be waterproof to preclude the entrance of water due to rain, melting snow, road splash and the penetration of moisture from all other causes. Vapor material shall be applied to prevent the possible accumulation of condensation on the interior of the van body. Seams shall be coated with a sealer to provide a waterproof joint.

H.3.1.4. Double Rear Doors. The van body shall be provided with a main door and an auxiliary door at the rear. The rear doors shall be side hung. There shall be a clear opening width of not less than 54 inches (137 cm) and a clear opening height of not less than 73 inches (185 cm). A door check shall be provided on each door, arranged to hold the door at 110°-120° and 170°-180° open positions. Door checks shall keep the doors opened while on a 30% side slope or a 60% grade.

H.3.1.5. Steps, Platforms, and Ladders.

H.3.1.5.1. Rear Steps. Rear steps shall be provided. Steps shall be centered and shall be at least 24 inches

(61 cm) wide. Provisions must be provided to center steps on opening and access through entrance doors. A means shall be provided in each stairway side member to attach handrails. The stairway (less handrails) shall not interfere with the opening and closing of the doors. The stairway shall be inclined at approximately 50° so the van can be accessed by personnel without holding onto the handrail. The steps shall have a non-skid surface. Steps shall be readily accessible and externally stowable and shall not be subject to damage during any vehicle operation.

H.3.1.5.2. Extension Ladder. The van shall be equipped with integral steps at the rear of the body which provide for safe roof access. These steps shall be exempt from MIL-STD-1472 requirements.

H.3.1.6. Insulation. The van body shall be sufficiently insulated to maintain temperatures as described in this annex. The insulation shall not support combustion, corrode metals, absorb odors, disintegrate under vibration or settle and leave voids, nor sustain flame, mold, rot or vermin, and shall be essentially odorless.

H.3.1.7. Walls and Ceiling. Interior walls, ceiling, floor, doors, and cabinets shall be waterproof. All joints shall be sealed.

H.3.1.8. Door Latches, Hinges and Hardware. When doors are opened, the hinges, latches and door-checks shall not protrude into the van body. All doors shall have hardware or devices to prevent inadvertent opening and closing. In addition to the door operating handle, a minimum 6 inches (15 cm) grab handle shall be provided on the inside of each door. Door-stops to prevent damage to body sides shall be provided for each door. A handle operable from the inside even if key locked externally shall be provided. The inside door shall be opened without disassembling any door latch or door handle hardware. Inside door handles shall be designed and placed to minimize inadvertent operations (opening a door) when accidentally hit or used as a grab handle.

H.3.1.9. Windows. There shall be two windows on each side of the van. Each window shall be 2 sq. feet (.19 sq. m) of tempered glass windows, with waterproof joints, on each side of the van. The windows shall include a bug screen and blackout doors, and shall be capable of being opened and closed readily. A .25-.30 sq. feet (.025 sq. m) fixed window with blackout shade shall also be located in the entrance door.

H.3.1.9.1. Glare Covers. The contractor shall provide canvas covers that will cover the side windows for reducing glare and use Velcro® to secure the covers both in the open and closed position.

H.3.1.10. Floor Loads. The LMTV van floor shall be capable of supporting an area load of at least 500 lbs/ft^2, and a point load of at least 100 psi at any point.

H.3.1.11. Interior Painting. The interior of the LMTV Van Body shall be painted in accordance with drawing 12420325 method 14.

H.3.1.12. Roof. The roof shall be capable of being walked on by a 95th percentile male (250 lbs) while broom clearing up to 6 inches of wet snow, without damage. Roof panels shall be secured to prevent panel vibration.

H.3.2. Electrical System. The electrical wiring within the van body shall be in metallic tubing, or raceways, which shall provide mechanical protection for wiring, and shall be in accordance with the National Electric Code (NEC). Wiring shall be color coded in accordance with provisions of the NEC and the National Fire Protection Association (NFPA). External power input shall be provided for three phase power AC power, 120 volts per phase, wye-connected, to give line to line voltage of 208 volts. The five conductors in the power cable shall be assigned functions as follows: three conductors for the three phase lines; one conductor for the neutral; one conductor for the equipment ground. The convenience outlets located on the interior walls of the van body shall be supplied by AC power from the external power input. Power distribution to the outlets shall be distributed equally from the three phases. Emergency and blackout lighting shall be supplied from the 24 volt DC systems, derived

from the vehicle's electrical system. An input of constantly live 24 volt DC shall be provided, taken from the vehicle's electrical system. The current capacity of this circuit shall be determined from the sum of currents required by blackout lights and emergency lighting devices

H.3.2.1. Van Body Illumination. Normal illumination for work areas in the van body shall be from 120 volt fluorescent fixtures, which are EMI suppressed. This lighting shall favor the periphery of the van body, providing a lighting level of 75 foot-candles, measured in a horizontal plane 30 inches above the floor, and 30 inches wide along the work area. Lighting fixtures shall be designed so as to prevent accidental dislodging of the lighting element from jarring of the vehicle's movement. Fluorescent fixtures shall have a quick start capability. The lights shall be mounted such that they are centered over work benches positioned against the wall. Four (4) 24 volt, 24 watt lights shall be mounted in the raceways such that the light is directed toward the center of the van. Each light shall be centered on each wall in the raceways.

H.3.2.2. Light Security. The van body with doors closed and blackout doors covering windows shall be completely light proof at all times under all conditions, precluding emission of light from the interior of the van body.

H.3.2.3. Rear Door Warning Light. A rear door warning light shall be provided. The light shall be located in the driver's compartment, in plain view of the driver, and shall flash (between 55 and 65 times per minute) when the rear doors are not securely latched closed. The light shall not be detectable from outside the vehicle and shall be interconnected with a low sound level buzzer. The warning light and buzzer shall only be operable when the ignition switch is in the run position.

H.3.2.4. Blackout Operations. Under blackout conditions, when the rear doors or window blackout doors violate light security, all lights internal to the van body which are not intended for use during blackout shall be automatically shut off.

H.3.2.5. Blackout Lights. Blackout lights shall be provided in the van body. While under blackout conditions, when light security is violated, blackout lights which cannot be detected by infra-red (IR) sensing devices shall be activated.

H.3.2.6. Power Requirements.

H.3.2.6.1. Exterior Power. The van shall be equipped with an exterior-mounted power entrance box which shall contain at least the following:

a. AC power entrance and distribution switch gear shall be located at the rear curb side of the van body.

b. External power input shall be provided for three phase power AC power, 110 volts per phase, wye-connected, to give line to line voltage of 208 volts. This input shall be accomplished through a five conductor cable, and the standardized MS 90558C44W12P connector for power input, and MS 90555C44N12S connector for AC output.

c. An input of constantly live 24 volt DC shall be provided, taken from the vehicle's electrical system.

d. One set of binding posts (two posts) shall be located on the outside of the van body for telephone communication.

e. Power inputs to the van body shall terminate in circuit breaker panels, which shall be located on the inside wall of the body, as close to the entry of the wiring as possible. There shall be separate panels for the AC and

the 24 volt DC systems. Allocation of branch circuits emanating from the power distribution panels shall be in accordance with NEC.

H.3.2.6.2. Power Distribution Panel. The van shall be equipped with an interior-mounted power distribution panel. The panel shall provide at least the following:

a. Main power on-off control, Main circuit breaker(s), Individual circuit breakers for: Air conditioner (208 volt), Heater (120 volt), Ventilation (110 volt), Interior lighting (110 volt). Circuit protection for the 24 volt DC shall be provided by a 20 amp manual reset circuit breaker.

b. Interior 110 volt curbside (passenger's side) and roadside (driver's side) convenience outlets (max. three (3) outlets per 20 amp breaker).

c. Capability to direct wire equipment into the distribution panel space for a minimum of 6 additional 110/208 volt 30 amp circuit breakers.

H.3.2.6.3. Switches. There shall be a double pole switch for both 110 volt and 24 volt interior lighting. The switch shall be located at the rear of the van. There shall be a blackout override switch for the two front AC convenience outlets. There shall be a blackout override switch located on the rear wall DC relay box. There shall be individual switches for all environmental control equipment.

H.3.2.6.4. Internal Convenience Outlets. There shall be at least 1-110 volt, 3 wire convenience outlets over each 3 feet (91 cm) of van length on both the road (driver's) and curb (passenger's) sides. The convenience outlets (mounted on the interior walls) so that the bottom of the lower outlet box is forty eight (48) inches above the floor (inside) of the van. All convenience outlets, three (3) on each side, shall be included by the blackout system.

H.3.2.6.5. Binding Posts. There shall be at least one pair of 24 volt binding posts wall and one grounding post located at the middle of each inside side wall at least 48 inches above the floor and 2 feet below the ceiling.

H.3.2.7. Heater. The van body shall be provided with a heater conforming to H.3.3.1. Vehicle 24 VDC shall be supplied for the operation of heater’s fuel pump.

H.3.2.8. Air Conditioner. The van shall be equipped with provisions to accept an air conditioning system conforming to H.3.3.1. The air conditioning system shall be operable independent of the vehicle engine.

H.3.3. Climate. Internal van body temperatures referenced hereinafter shall be recorded at the center of the van body cube.

H.3.3.1. Climate Control. The van body shall be provided with a means of reaching and maintaining a temperature of between 65°F to 80°F. This temperature range shall be obtainable within 45 minutes after the heater or air conditioner is turned on, for outside temperatures ranging from -25°F to 120°F. An air conditioning kit is allowable to meet this requirement.

H.3.3.2. Cold Conditions. For outside temperatures less than -25°F to -50°F, a temperature of at least 60°F shall be obtainable within 60 minutes after the heater is turned on. A kit is allowable to meet this requirement.

H.3.3.3. Ventilation. The van shall be equipped with integral ventilation fan(s) which shall provide a complete change of air every three (3) to four (4) minutes. The air shall be dust and dirt filtered. The filters shall be readily accessible for ease of changing.

H.3.4. Basic Issue Items (BII). The following BII is unique to the LMTV van, and shall be supplied with

each van in addition to those items listed in the main specification.

H.3.4.1. Rod. Ground, 30 inch, NSN 2510-00-790-2296.

H.3.4.2. Cable. Ground, 12 foot - IAW drawing 12421527.

H.3.4.3. RESERVED.

H.3.4.4. Hammer. 3-pound hammer to drive ground rod.

H.3.5. Stowage of the External Power Cable. The van shall incorporate stowage capability for the 50 foot external power cable and stub cable. The power cable part number SC-D-883963 GRP9-3, NSN 5995-01-134-3159, and cable stub (10 feet) part number SC-D-883964 GRP9-1, NSN 5995-01-190-5573 are applicable. The cables shall be stowed on the floor of the LMTV van with two tie-downs.

H.3.6. Tapping Plates. Six inch wide tapping plates for securing cabinets shall be placed along the wall and floor. The plates shall be located 30 inches above the floor on both inside walls. Two six-inch tapping plates shall be located on the floor of the van along its length and shall be centered 12 inches from each side wall. Floor plates shall be beveled to avoid tripping by personnel.

H.3.7. Caution Plate for Securing Loads. Provide a Caution Plate referencing the technical manual inside the van, to remind the soldier to properly stow, tie down and/or brace all loose and other items inside the van prior to shipment by rail.

H.4. Standard Van Test. To determine conformance to para H.2.1, the LMTV standard van shall be checked for compliance to the requirements specified.

H.4.1. Van Body. (para H.3.1).

H.4.1.1. Dimensions Check. To determine conformance to para H.3.1.1, the LMTV van variant shall be inspected for the dimensions specified.

H.4.1.2. Transportability Verification/Test. To determine conformance to para H.3.1.2, the LMTV van variant shall be verified and tested in accordance with the main body FMTV specification, para 4.7.31 (inclusive). During testing at a Government proving ground, the preparation time required for air transportability shall be verified by two people using standard tools.

H.4.1.3. Waterproofness Test. Water testing shall comply with MIL-STD-810, Method 506.4, para 4.4.3, Procedure II- - Water tightness except the test duration time shall be for 15 minutes.

H.4.1.4. Double Rear Door Check. To determine conformance to para H.3.1.4, the van rear doors shall be checked for the specified dimension, configuration, and door check arrangement. The door checks shall be checked for specified open position while on a 30% side slope and tested again on a 60% grade.

H.4.1.5. Rear Steps Check/Test. To determine conformance to para H.3.1.5, through H.3.1.5.2the van rear steps shall be checked for specified position, dimension, and non-skid surface. During Government proving ground testing, rear steps shall be checked periodically for accessibility, stowage, and damage.

H.4.1.6. Insulation Certification. To determine conformance to para H.3.1.6, the contractor shall certify the insulation in the van body does not support combustion, corrode metals, absorb odors, disintegrate under vibration, settle and leave voids, or sustain flame, mold, rot, or vermin.

H.4.1.7. Walls and Ceiling Check. To determine conformance to para H.3.1.7, the walls, ceiling, floor, doors, and cabinets shall be checked for the seals and/or the sealant.

H.4.1.8. Door Latches, Hinges and Hardware Check/Certification. To determine conformance to para H.3.1.8, the LMTV van variant shall be checked for specified requirements. Doors shall be checked for specified grab handles. The van shall be checked for specified door stops for each door. Inside door handles shall be checked for specified operability. The contractor shall certify the door latches, hinges and hardware comply with FMVSS 206.

H.4.1.9. Windows Check. To determine conformance to para H.3.1.9, the LMTV van variant shall be checked for the specified size of windows, window waterproofness, and equipment. During Government proving ground testing, windows shall be periodically tested for specified operation.

H.4.1.10. Floor Load Certification. To determine conformance to para H.3.1.10, the contractor shall certify that the LMTV van floor supports the minimum area load and point loads specified.

H.4.1.10.1. Interior Painting Check. To determine conformance with H.3.1.11, the interior of the LMTV Van Body shall be checked for proper application of paint in accordance with the referenced specifications. After application of the final coat of paint, the surface shall be checked for smoothness and shall be free of grit, seeds, streaks, running, sagging, wrinkles, pinholes, craters, and nonconformity of specified colors. During production, the Contractor's Quality Assurance System (see 4.1.1) shall have methods and instructions for In-Process Inspection, to verify cleaning, pre-treating, primer application, and top coat application procedures conform to the referenced documents.

H.4.1.10.2. Roof Verification/Test. To determine conformance to para H.3.1.12, the LMTV van variant shall be subjected to a proof load to simulate 6 inches of wet snow and 5th through 95th percentile soldier placed on the roof on the van. The weight shall be evenly distributed and remain in place for not less than one hour. At the end of the allotted time, the weight shall be removed. Evidence of damage to the van body or equipment shall be cause for rejection.

H.4.1.11. Electrical System Certification. To determine conformance to para H.3.2, the contractor shall certify that the wiring meets the protection requirements of the National Electrical Code, the NFPA.

H.4.1.12. Van Body Illumination Test/Check. To determine conformance to para H.3.2.1, the illumination in the LMTV van body compartment shall be tested for a minimum 75 foot candle intensity, when measured 30 inches up from the floor, and 30 inches wide along the inside, with all doors and blackout shades closed. Fluorescent lights shall be checked for instant start capability and removable covers with positive locks. Fluorescent tubes shall be periodically checked during testing at a Government proving ground for indication of loosening due to vehicle movement or vibration.

H.4.1.13. Light Security Test. To determine conformance to Para H.3.2.2, the LMTV van body shall be tested, with doors and blackout shades closed, at night with all sources of illumination operating within the van body. No light shall be visible or detectable from any location outside of the van body.

H.4.1.14. Rear Door Warning Light Test. To determine conformance to para H.3.2.3, the rear door warning light shall be tested for light operation, flash time, visibility, and buzzer requirements specified.

H.4.1.15. Blackout Operations/Blackout Lights Verification. To determine conformance to para H.3.2.4 and para H.3.2.5, the van body, under blackout conditions with all internal lights activated, shall have the rear doors opened to verify that when the doors are opened the lights are automatically shut off and blackout lights, that cannot be detected by infra-red (IR) sensing devices, are automatically activated. The rear doors shall then be closed to verify that when the doors are secured, the internal lights automatically activate and that the blackout lights

automatically terminate. When blackout shades are moved, causing a violation of light security, all internal lights shall be automatically de-activated and blackout lights shall be simultaneously and automatically activated. When blackout shades are placed securely over windows, blackout lights shall be automatically terminated and internal lighting shall be automatically restored. The test shall be repeated once for each window.

H.4.1.16. Exterior Power Check. To determine conformance to para H.3.2.6.1, the van body shall be checked for the exterior power equipment specified.

H.4.1.17. Power Distribution Panel Check. To determine conformance to para H.3.2.6.2, the van body shall be checked for the interior power distribution panel equipment specified.

H.4.1.18. Switches Check. To determine conformance to para H.3.2.6.3, the interior of the van body shall be checked for the specified switches in the front and rear of the van body. The van body shall also be checked for the internal/external 24 VDC power source switch and individual switches for all environmental equipment specified

H.4.1.19. Interior Convenience Outlets Check. To determine conformance to para H.3.2.6.4, the van body shall be checked for the outlets at the distances specified on each side of the interior of the van body.

H.4.1.20. Binding Posts Check. To determine conformance to para H.3.2.6.5, the van body shall be checked for the binding posts at the locations specified on each side of the interior.

H.4.1.21. Heater Verification. To determine conformance to para H.3.2.7, the van body shall be inspected for the heater specified.

H.4.1.22. Air Conditioning Verification. To determine conformance to para H.3.2.8, the van body shall be inspected for the air conditioner specified.

H.4.1.23. Climate Control Test. To determine conformance to para H.3.3 (inclusive), the vehicle shall be tested for the requirements specified at a Government proving ground.

H.4.1.24. Basic Issue Items (BII) Verification. To determine conformance to para H.3.4 (inclusive), the vehicle shall be inspected for the BII items specified.

H.4.2. External Power Cable Stowage Check. To determine conformance to **Error! Reference source not found.**, the van shall be inspected for the specified stowage provisions.

H.4.3. Tapping Plates Check. To determine conformance to **Error! Reference source not found.**, the interior of the van body shall be inspected for the presence of the specified tapping plates. The tapping plates shall be inspected for comformance to the specified requirements.

H.4.4. Caution Plate for Securing Loads Check. To determine conformance to **Error! Reference source not found.**, the van shall be inspected for the presence of the specified Caution Plate.

ATPD 2131C, DATED 20 Feb 03
SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX I

LMTV CHASSIS

I.1. Chassis. Cargo Chassis for the LMTV shall be available as described herein.

I.2. General Requirements. Cargo chassis utilized in constructing a model of the LMTV shall be available without body.

I.3. Specific Requirements. The chassis shall be used to mount special purpose equipment such as maintenance contact units, mobile decontamination units, generator sets.

I.4. General Requirements Check. To determine conformance to para I.2, each version of the LMTV chassis shall be checked to verify it can be obtained without body.

I.4.1. Specific Requirements. To determine conformance to para I.3, the LMTV chassis shall be checked for the mounting requirements specified. The contractor shall supply design concept drawings not later than 90 days prior to First Production Vehicle Inspection, showing design considerations for mounting the special purpose units specified.

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SUPERCEDES ATPD 2131C, DATED 11 Oct 02
SUPERCEDES ATPD 2131B, DATED 03 Dec 01

ANNEX J

TRAILER, CARGO: LMTV WITH DROPSIDES

TRAILER, CARGO: MTV WITH DROPSIDES

J.1. Scope. This annex covers MTV and LMTV cargo trailers. The MTV trailer shall be 4 wheel (tandem). Both shall be cart-type trailers.

J.2. General Use. The trailers are companion trailers to the LMTV and MTV. The LMTV cargo trailer shall be pulled primarily by the LMTV but must be capable of being towed by the MTV. The MTV cargo trailer shall be pulled by the MTV and must be capable of being towed by LMTV to the limits of its trailer towing capacity. Both trailers shall be capable of being towed by current 2 1/2-ton, and M939 series 5-ton trucks, within truck towing abilities. Optimum design consideration must be given to the FMTV. The trailers must be capable of operating under and withstanding the same on road/off road conditions as the LMTV and MTV. All parts of the trailers shall properly sustain the maximum gross vehicle weight (GVW) stated herein. The MTV and LMTV trailers shall meet Title 49 CFR requirements for highway ammunition shipment.

J.3. Trailer Characteristics.

J.3.1. Performance Characteristics. The trailer shall meet the performance characteristics as specified herein at GCW, when the LMTVT is coupled to either the LMTV or MTV and the MTVT is coupled to the MTV.

J.3.1.1. Lateral Stability. The trailer, with full payload at a CG of 24 inches (61 cm) above bed height, shall sustain a minimum .3 g lateral acceleration without overturning or experiencing liftoff of any trailer wheels while operating on a flat, dry, level surface.

J.3.1.2. Tracking and Turning.

J.3.1.2.1. Tracking. The trailers shall conform to the tracking requirements of FMCSR 393.70.

J.3.1.2.2. Turning. The trailers, while coupled to any of the prime movers with the prime mover operating in its minimum tracking circle forward, shall track right and left without damage to the trailer or prime mover and without interference between the towed vehicle and trailer.

J.3.1.3. Speeds. The trailers at all permissible loads shall be capable of operating at speeds specified for the prime movers in all on/off road conditions without damage or interference.

J.3.1.4. Fording. The trailers shall be capable of operating in both fresh and salt water in depths of at least 30 inches (76 cm) without preparation. Fording operations shall not result in degradation of trailer components nor render the trailers incapable of performing any operations of this specification. Excepted are nonsealed brake components requiring drying time.

J.3.1.5. Braking. All Trailers shall be equipped with an Anti-lock Brake System (ABS) as described in section 3.2.1.11.

J.3.1.5.1. Service Brakes. All trailers shall be equipped with service brakes. The combined prime mover and trailer service brakes shall control and hold the vehicle combination on a dry hard-surfaced 30% grade when headed up or down slope.

J.3.1.5.2. Parking Brakes. Manually activated parking brakes shall hold the trailers with full payload on dry, hard, smooth-surfaced road on a 30% grade while uncoupled from the towing vehicle and headed up or down grade.

J.3.1.5.3. Emergency Brakes. The trailer brake system shall include an emergency break away feature. This feature shall apply emergency brakes when the air supply from the prime mover ceases. When activated, the brakes shall be sufficient to hold the fully loaded trailer on a dry, hard, smooth-surfaced road on a 30% grade while headed up or down grade.

J.3.1.6. Approach and Departure Angle. The approach and departure angle shall be as great as practical to optimize truck/trailer mobility. Departure angles shall be not less than 20 degrees for the LMTVT and not less than 40 degrees for the MTVT when measured on level ground with the trailer lunette at a height of 30 inches above the ground. Landing gear, storage box, spare tire carrier and other trailer components shall be mounted on the trailer in locations that do not reduce the trailer approach and departure angle.

J.3.1.7. Ground Clearance. The trailer shall have a ground clearance at least equal to the under axle clearance of their respective MTV and LMTV prime movers.

J.3.2. Physical Characteristics.

J.3.2.1. Dimensions. Trailer dimensions for worldwide operation and transportability shall not exceed the following: Width: 96 in. (244 cm); Height: At a minimum but as required to meet all requirements as specified herein; Length: As required to permit loading of two trailers without stacking (LMTVT, MTVT or any combination) in a C130 aircraft as specified herein.

J.3.2.2. Trailer Loading.

J.3.2.2.1. RESERVED.

J.3.2.2.2. RESERVED.

J.3.2.2.3. Vehicle Payload. Trailer payload shall be at least 5,000 lb. (2,268 kg) for the LMTVT, and a minimum of 10,000 lb. (4,536 kg) for the MTVT.

J.3.2.3. Protective Coating. The trailers shall have the same protective coating as the FMTV trucks.

J.3.2.4. Reliability and Maintainability. As per Table I of this specification.

J.3.2.5. Suspension.

J.3.2.5.1. Suspension and Axles. The MTV trailer shall have two axles. Axle spacing shall be a minimum of 48 inches (122 cm) to meet C130 aircraft loading requirements. All suspension components shall have rated capabilities at least equal to the maximum load at GVW that can be imposed on each member measured at the ground. The suspension design shall limit the vertical natural frequency of the sprung mass to the extent feasible within the performance parameters of this specification.

J.3.2.5.2. Wheel, Rims and Tires. Trailers shall be equipped with single radial tires, common to the MTV/LMTV prime movers. Commonality of tires with the prime mover is required. Trailers shall be equipped with rim covers on the wheel exterior that are common with those on the prime mover (reference 3.4.5.2). Rim and tire ratings shall conform to FMVSS 119 and SAE or tire and rim association recommendations for type and size tires

furnished. Tire and wheel assembly shall be replaceable by the prime mover crew utilizing FMTV truck on vehicle equipment. Tires shall be repairable and replaceable at organizational level. Special tools must be identified.

J.3.2.6. Brake System Hoses, Fittings and Couplings. Air lines/hoses shall conform to FMVSS 106, supply air for braking and be permanently attached by threaded fitting to the trailers. Air lines shall be routed along the trailer tongue and be of sufficient length to couple with the gladhands at the rear of the towing vehicle. No pulling or kinking of lines shall occur throughout the articulation range between the towed and towing vehicle. Couplers shall comply with SAE J318 and be compatible with A-A-52484 couplers. They shall be identified by tags conforming to A-A-52483 service and emergency. Dummy couplers shall be provided for storing air lines when not in use.

J.3.2.7. Electrical. Trailer electrical system shall be 12 volt with 24 volt military adaptations defined below. Lighting shall meet all requirements when trailer is transported loaded or unloaded.

J.3.2.7.1. Receptacle System, 12/24 volt. The trailer shall be equipped with one 12-contact receptacle with cover and one 7-contact receptacle with cover installed at front of trailer. The 12-contact receptacle shall conform to MS 75021-1 and be equipped with cover assembly conforming to ordnance drawing 7731428. The 7-contact receptacle shall conform to SAE J560 round socket for jumper cable. The 12-contact receptacle shall be provided with resistance to each circuit to reduce the voltage of a tactical military-design towing vehicle from 24 volts to 12 volts. The 7-contact socket shall be wired in accordance with SAE J560 to supply 12 volts directly to the trailer circuits. The 24 volt, 12-contact receptacle shall be through the necessary resistor into the 12 volt trailer circuits as follows:

A	Do not connect
B	Connect to circuit no. 3
C	Do not connect
D	Connect to circuit no. 1
E	Connect to circuit nos. 2 and 6*
F	Do not connect
H	Do not connect
J	Connect to circuit no. 5
K	Do not connect
L	Do not connect
M	Do not connect
N	Do not connect

The contact receptacle shall conform to MS 75021-1 and nut, grommet retaining shall conform to Ordnance drawing 7723309 and grommet, electrical connector shall conform to Ordnance drawing 7722333.

*NOTE: In addition, the connection between circuits 2 and 6 (on the 7-pin connector) shall have a readily accessible external switch, to allow for breaking of this circuit when the 7-pin connector is attached to the towing vehicle in lieu of the 12-pin connector. Circuits B and J on tactical truck tractors are combination stop and turn signals and stop lights and the normal 12 volt stop lights shall not be in operation when the trailer is connected to a towing vehicle with a 24 volt power supply. Because of this connection, the no. 4 stop light circuit is not connected to the 24 volt, 12-contact receptacle.

J.3.2.7.2. Blackout Lighting. Trailer shall be equipped with blackout stop and tail lights.

J.3.2.7.3. Connecting Cable, Electrical inter-vehicular. Cables of sufficient length to reach the towing vehicle without interference during operation and capable of connecting to a 7- and 12-pin towing vehicle connector shall be provided.

J.3.2.7.4. Reflectors. Reflectors and mounts shall be IAW FMVSS 108.

J.3.2.8. Storage Box. A fully enclosed storage box shall be provided to store special equipment and BII. The box shall have a hinged door with appropriate latch to secure the door closed by padlock. The box shall be fully accessible with the trailer loaded and unloaded.

J.3.2.9. Trailer Cargo Bed. The trailers shall have cargo beds similar to the MTV and LMTV basic cargo models to include soft top kit mounting provisions and storage provisions for the bows. The MTVT shall have a minimum internal bed length of 14 feet (427 cm) and a minimum usable width of 90 inches (229 cm) with sides up. The LMTVT shall have a minimum internal bed length of 147 inches (373 cm) and a minimum usable width of 90 inches (229 cm) with sides up. Bed sides shall be the same as the LMTV and MTV cargo models respectively, except that trailer sides shall not include integral troop seats. Storage space which does not infringe upon the bed area shall be provided for dropsides when not in use. Cargo bed tiedowns shall meet the requirements of the LMTV and MTV tiedowns (annex G and A, respective to weight class), except the cargo tiedown locations shall be in accordance with the technical data package provided with this solicitation.

J.3.2.10. Landing Gear. The trailers shall have landing gear which is infinitely adjustable within the necessary range for potential towing vehicles with an additional 4 inches of adjustment at each extreme. The landing gear pads shall be such that nominal penetration is ensured at an RCI of 60.

J.4. General Test. To determine conformance to para J.2 and para J.3.1, during Initial Production Testing at a Government proving ground, the trailers shall demonstrate the capability of being towed at GVW, or maximum towing weight of the mover, by each vehicle specified.

J.4.1.1. Lateral Stability. To determine conformance to para J.3.1.1, the trailers shall be subjected to cited lateral acceleration.

J.4.1.2. Tracking Test. To determine conformance to para J.3.1.2.1, the trailers shall be tested for the tracking requirements of FMCSR 393.70.

J.4.1.3. Turning Test. To determine conformance to para J.3.1.2.2, the trailer, coupled singly in turn to each prime mover, shall be operated at minimum forward tracking circle in both the right and left directions. The turning test shall be conducted in all combinations of both prime mover and trailer fully loaded and without load. During tracking in both right and left directions, the trailer shall be checked for interference and/or damage to the prime mover or itself.

J.4.2. Speed Test. To determine conformance to para J.3.1.3, the LMTVT coupled to the LMTV, and the MTVT coupled to the MTV, shall be operated at the specified speeds in all on/off road conditions. During First Article Inspection (para 4.3), the trailers shall be examined for damage or indications of interference.

J.4.3. Fording Test. To determine conformance to para J.3.1.4, the trailers, fully loaded and without load, shall be operated without preparation at the depth specified. After fording tests and during durability testing, the trailers shall be examined for trailer component failure or degradation due to fording contamination.

J.4.4. Service Brakes Test/Certification. During initial production tests, control tests, and comparison tests, service brakes shall be tested to determine conformance to para J.3.1.5.1, for the ability at GVW to control and hold the combined prime mover and trailer on the maximum specified grade in the ascending and descending position without special preparation or cleaning of the under carriage. The contractor shall certify that the prime mover and trailer service brakes, under all loading conditions, meet the combined vehicle stopping distances of the appropriate FMVSS, for the type brake system used.

J.4.5. Parking Brake Test. During initial production tests and comparison tests, conformance to para J.3.1.5.2 shall be demonstrated at specified gross trailer weight, without special preparation or cleaning of the under carriage. The trailer shall be fully loaded on dry, hard, smooth surface road, on 30% grade. While uncoupled from towing vehicle, manually applied parking brakes shall hold the trailer motionless, headed both up and down slope.

J.4.6. Emergency Brake Test. To determine conformance to para J.3.1.5.3, the trailer shall be tested for the emergency break-away feature, as specified.

J.4.7. Departure Angle Check. To determine conformance to para J.3.1.6, the angle of departure shall be measured on level ground in accordance with SAE J1100 with the trailer lunette 30 inches above the ground.

J.4.8. Ground Clearance Check. To determine conformance to para J.3.1.7, the trailer shall be measured for the minimum ground clearance between axles and under axle clearance, as its respective prime mover.

J.4.9. Dimensions Check. To determine conformance to para J.3.2.1, the width shall be measured for the specified requirements. The length and height shall meet the specified requirements by demonstration during initial production testing.

J.4.10. Gross Vehicle Weight (GVW) Check. To determine conformance to para J.3.2.2, a fully equipped trailer with payload shall be weighed for the specified GVW requirement. For purposes of contractor control tests, the GVW requirement may be met by installation of a standard payload of the weight specified for each model in each control test trailer. Standard payloads shall be identified by marking with trailer model and payload weight.

J.4.11. RESERVED.

J.4.12. RESERVED.

J.4.13. Protective Coating Check. To determine conformance to para J.3.2.3, the trailers shall be checked for proper metal preparation and application of primer and paint in accordance with referenced specifications.

J.4.14. Reliability and Maintainability Verification.

J.4.14.1. Mean Miles Between Hardware Mission Failures (MMBHMF). A reliability verification of the trailer(s) test performance shall be conducted to verify that the Mean Miles Between Hardware Mission Failure (MMBHMF) requirements, specified in para J.3.2.4, has been attained utilizing generated test data (i.e., Test Incidents Reports (TIRs)).

J.4.15. Suspension and Axles Check. To determine conformance to para J.3.2.5.1, the trailer's suspension and axles shall be checked for proper mounting clearance, lubrication, and axle spacing (48 inches minimum). The trailer suspension shall be periodically inspected during Government proving ground tests to detect any overstress condition.

J.4.16. Wheel, Rims and Tires Check/Certification. To determine conformance to para J.3.2.5.2, the trailer's wheels, rims and tires shall be checked for proper type ratings specified. The contractor shall certify that the

rims and tire ratings conform to FMVSS 119. Rim covers shall be checked for commonality with those on the prime mover.

J.4.17. Brake System Hoses, Fittings and Couplings Check. To determine conformance to para J.3.2.6, the air hose fittings and their locations shall be checked for compliance to the requirements of SAE J702. The couplers shall be checked for compatibility with A-A-52484 couples. The couplers shall be checked for identification tags specified. The connectors and air lines shall be periodically inspected during Government proving ground tests to detect any pulling or kinking.

J.4.18. Electrical Check. To determine conformance to para J.3.2.7, the electrical system shall be inspected to the requirements specified. The electrical system shall be checked to ensure protection from operational hazards during testing at government proving grounds. During Quality Conformance Inspections, the trailers shall be checked for location, protection, condition, and coding of electrical wiring/harnesses.

J.4.19. Receptacle System (12/24-volt) Check. To determine conformance to para J.3.2.7.1, specified receptacles shall be checked for conformance to MS, SAE, and drawing requirements specified. The 12 and 24 volt receptacles shall be tested for proper operation during testing at a Government proving ground.

J.4.20. Blackout Lighting Check. To determine conformance to para J.3.2.7.2, the blackout stop and tail lights shall be checked.

J.4.21. Connecting Cable, Electrical Intervehicular, Check. To determine conformance to para J.3.2.7.3, the cables shall be checked for sufficient length, interference, and the capability of connecting to 7 and 12 pin towing vehicle connectors during testing at Government proving ground.

J.4.22. Reflectors Certification. To determine conformance to para J.3.2.7.4, the contractor shall certify that the trailer reflectors meet the mounting requirements of FMVSS 108.

J.4.23. Storage Box Test. To determine conformance to para J.3.2.8, the storage box shall be checked for the design requirements specified. During Government proving ground testing, and after completing the maximum fording depth specified, the storage box shall be checked for the waterproofness requirement specified.

J.4.24. Trailer Cargo Bed Check. To determine conformance to para J.3.2.9, the cargo beds shall be inspected for the requirements specified.

J.4.25. Landing Gear Test. To determine conformance to para J.3.2.10, the trailer shall be loaded to GVW. During operations, the landing gear shall demonstrate the capability to support the trailer over the specified adjustment range. The landing gear pads shall also be tested for conformance to the RCI specified.

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ANNEX K

CENTRAL TIRE INFLATION SYSTEM (CTIS)

K.1. Scope. This specification establishes the performance and test requirements for an FMTV-compatible central tire inflation system.

K.2. Applicable Documents. The basic FMTV specification applies to this annex; all documentation specified therein is incorporated by reference herein.

K.3. Requirements

K.3.1. Tire Pressure Control. This system shall allow the driver to adjust all truck tires to any one of four preset tire pressures. System control shall be mounted within the cab so that the driver may activate the system while continuing to operate the truck.

K.3.2. RESERVED.

K.3.3. Provision and Storage of Air. The CTIS shall contain necessary compressor and/or stored air capability to meet the inflation and deflation time requirements as stated herein. CTIS shall be operable with and without an operable spare tire. The system shall provide infinitely repeatable adjustments of air pressures among those specified. System recovery time shall be such that the operations in para K.3.9 shall be accomplished within the time limits stated immediately subsequent to any other inflation/deflation activity and are included in those stated times.

K.3.4. Manual Tire Inflation/Deflation. The system shall provide for the isolation of any or all tires from the CTIS in the event of CTIS failure for any reason. Manual tire inflation procedures may require two persons. Valves for manual inflation shall be readily accessible and compatible with the standard on-board manual inflation system.

K.3.5. Air-Priority System. The CTIS shall incorporate sufficient safeguards to assure that air pressure necessary to continue safe operation of the truck shall be available at all times during activation of CTIS or in the event of CTIS failure. Use of brakes is a minimum requirement for safe operation.

K.3.6. Speed/Pressure Control and Warning. The CTIS shall include sensing of the truck speed and comparing the indicated speed to the maximum allowable speed for each control setting. In the event that truck speed exceeds maximum allowable speed for that setting, a panel-mounted light shall activate to warn the driver of this condition. If average speed exceeds maximum allowable speed for a period of more than one minute, the system shall automatically inflate to the appropriate pressure.

K.3.6.1. Speed Detection/Driver Alert Sensors shall alert the truck operator by a flashing green light whenever speed exceeds that suitable for sustained operation at tire pressures appropriate to mobility requirements. The CTIS overspeed indicator shall not activate when in the blackout mode. As a minimum, four pressure settings shall be available to the driver. Settings shall be designated as Emergency, Mud/Snow/Sand, Cross-country, and Highway. A dimming feature shall not be required for the LED indicators and legend illumination associated with the CTIS driving mode selector.

K.3.7. Maintenance of Tire Pressure. With the CTIS in operation, tire pressure shall be certified and adjusted at intervals necessary to assure that no more than a 3 psi (.2 atm) variation exists between selected pressure

and actual pressure except during the inflation/deflation operation caused by the selection of a new tire pressure. With the CTIS not in operation and the truck engine not running after twenty-four hours, the tire pressure shall not drop below 97% of the pressure which existed before the truck engine was stopped. No action shall be required of crew personnel beyond normal trucks shutdown to meet this requirement. The gas law pressure/temperature relations shall be taken into account when determining compliance with this requirement.

K.3.8. Operating Environment. The CTIS shall be fully operational under all the operating conditions and environments described in the basic FMTV specification.

K.3.9. Time to Inflation/Deflation. The CTIS shall be capable of operating within the time constraints as listed below showing the time allowed to complete the operation (minutes:seconds):

INFLATION

From	To	Time Allowed
Cross-country	Highway	4:00
Mud & Snow	Cross-country	3:00
Emergency	Mud & Snow	2:00

DEFLATION

From	To	Time Allowed
Highway	Cross-country	3:00
Cross-country	Mud & Snow	3:00
Mud & Snow	Emergency	4:00

*Truck models requiring greater inflation pressures than the standard MTV cargo model will be allowed a proportionately greater time for inflation/deflation.

K.4. Tire Pressure Control Check. To determine conformance to para K.3.1, the CTIS shall be activated by the driver from the cab while the vehicle is being operated over the range of operating speeds required.

K.4.1. RESERVED.

K.4.2. Provision and Storage of Air Examination. To determine conformance to para K.3.3, the contractor shall examine the system and each component for completeness of assembly and quality of workmanship.

K.4.2.1. Air Compressor Tests. The contractor shall perform tests on the air compressor to verify its output, endurance, and other performance requirements specified by the manufacturer.

K.4.2.2. Storage Tank Test. If a separate storage tank is provided, the contractor shall test the tank to verify its storage capability. A minimum of 50 air filling and purging operations shall be conducted within a five-minute interval.

K.4.3. Manual Tire Inflation/Deflation Check. To determine conformance to para K.3.4, the CTIS feed line at each wheel shall be disconnected and each tire manually inflated and deflated to each required setting.

K.4.4. Air-Priority System Test. To determine conformance to para K.3.5, applicable vehicle air-activated sub-systems shall be inspected while the CTIS is operating. No degradation is permissible. The vehicle shall be tested, with one wheel incapacitated (i.e., no sealing and losing air), to demonstrate that air-activated brakes

continue to function. During this test, the vehicle's brakes will be actuated, and a minimum vehicle brake system air pressure shall be maintained.

K.4.5. Speed/Pressure Control Warning Test. To determine conformance to para K.3.6(inclusive), the speed/pressure warning device shall be tested to the specified conditions and requirements.

K.4.6. Maintenance of Tire Pressure Check. To determine conformance to para K.3.7, the CTIS shall be inflated to each setting and each wheel shall be checked with an air pressure gage. A greater than 3 psi variation between the selected pressure and actual pressure is cause for rejection. In addition, the vehicle shall be parked for a minimum of twenty-four hours and then shall be inspected to insure that not less than 97% pressure remains. Gas law pressure/temperature relations will be taken into account when determining compliance.

K.4.7. Operating Environment Test. To determine conformance to para K.3.8, the vehicle CTIS shall be tested to the environmental conditions of the basic FMTV specification. Storage time for test purposes is a minimum of 24 hours.

K.4.8. Inflation/Deflation Time Tests. To determine conformance to para K.3.9, the Inflation and Deflation requirements shall be tested using a stopwatch. The time to both inflate and deflate from each of the sequential tire pressure settings shall be recorded with the engine both at full throttle and high idle. If the truck fails to meet the required time at either of these engine speeds, the testers shall cycle the truck through the settings and record tire pressures at the time limits. The complete test shall be repeated a minimum of three times.

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ANNEX L

CHEMICAL EQUIPMENT

L.1. Scope. This annex describes those items of chemical agent environment equipment which shall be utilized on vehicles of the FMTV and which require that provisions be made for their utilization. Mounting hardware shall be installed on all trucks.

L.1.1. M43 Detector (M8 System). Space shall be provided for the M43A1 detector. The preferred location for the detector is outside the cab; however, internal mounting is acceptable if external air is being monitored and the output of the detector sampling air is ducted outside the cab compartment and the requirements of the specification are met. The M43A1 shall be mounted in its upright position. Threaded holes/weld nuts, or equivalent, shall be provided in the selected position, along with bolts/fasteners tightened in place thus providing expeditious installation of equipment with the use of on-board vehicle tools. A 24 volt D.C. power source is required for M43A1 Detector operation and a two (2) wire electrical harness shall be routed to the M42 Alarm location. Detailed information on mounting bracket dimensions/hole locations, detector size and electrical connector definition is provided on Drawing D5-15-8779. Detector weight is 7 lb. (3 kg).

L.1.2. M42 Alarm (M8 System). Space shall be provided inside the cab for the M42 Alarm and mounting bracket. Bracket mounting hardware, required for installation, shall be supplied as outlined in para 3.2.6. Detailed information on mounting bracket dimensions/hole locations is provided on CRDC Drawing D5-15-8779 (Part No. D5-15-5490). Alarm and bracket weight is 4 lb. (1.7 kg).

L.1.3. M256 Portable Chemical Agent Detection Kit. Space shall be provided inside the cab for the M256 Kit. The kit carrying case shall be positioned to rest on its base which measures 7.2x3.3 inches (18.3x8.4 cm) . The case is 5 inches (13 cm) high and, including the case, weighs 1.2 lb. (.5 kg). The case shall be restrained by a quick disconnect type device to prevent unseating when traveling over rough terrain.

L.1.4. M9 Chemical Agent Detector Paper. Space shall be provided inside the cab for the M9 Paper Pack. The pack measures 2 inches (5 cm) square by 3 inches (7.62 cm) high. Additional space is required to accommodate the vacuum-packed bag overwrap. The pack shall be restrained as per L.1.3. The M9 Pack weighs .5 lb. (.2 kg).

L.1.5. M13 Decontamination Apparatus, Portable (DAP). Space for stowing the DAP shall be furnished. External mounting is preferred; however, internal mounting is acceptable. The M13 DAP shall be mounted in its upright position using attaching bracket A-A-52513. The M13 DAP is 19.2 inches (49 cm) high, 14.7 inches (37 cm) wide, 6.7 inches (17 cm) deep and weighs approximately 55 lb. (24 kg).

L.1.6. Chemical Protective Garments. Space shall be provided inside the cab for the following: NBC overgarment suits, MIL-S-43926, 4 1/2 x 14 x 15 inches, two per crewmember; NBC mask 12x9x4 inches (30x23x10 cm) one per crewmember; NBC gloves 6x6x1 inches (15x15x2.5 cm) two pair per crewmember; NBC overboots 11x5x4 inches (28x13x10 cm) two per crewmember; NBC hood 4x4x1 inches (10x10x2.5 cm) one per crewmember. The NBC garments shall be restrained either individually or with a device capable of restraining the balance of the NBC garments when only a portion of the garments have been removed.

L.2. RESERVED.

L.3. RESERVED.

L.4. M43 Detector (M8 System) Check/Test. To determine conformance to para L.1.1, the vehicle shall be

examined for dedicated space and capacity to mount the M43 detector. The space shall be checked for proper marking and electrical connections. During testing at a Government proving ground, an M43 Detector shall be installed, with an M8 system, using on-board vehicle tools and examined for proper operation. If internal mounting is provided, the area for sampling outside air and the duct for expelling sampled air shall be checked for leakage into crew compartment. If externally mounted, the mounting area shall be checked for adequate equipment protection.

L.4.1. M42 Alarm (M8 System) Check/Test. To determine conformance to para L.1.2, the contractor shall provide space in the cab for M42 alarm and mounting bracket. During testing at Government proving ground, an M42 alarm shall be installed with on-board vehicle tools and examined for proper functional operation as required.

L.4.2. M256 Portable Chemical Agent Detection Kit Check/Test. To determine conformance to para L.1.3, the vehicle shall be examined to ensure the contractor has provisioned Detection Kit dedicated space. During testing at a Government proving ground, the kit shall be base-mounted with a quick-disconnect device, and it shall undergo a rough terrain driving test, in vehicle, to ensure it is sufficiently secured to prevent unseating, and that it functions to specifications.

L.4.3. M9 Chemical Agent Detector Paper Check/Test. To determine conformance to para L.1.4, visually ensure M9 Paper Pack is secured inside cab with quick-disconnect device, as outlined in paragraph L.1.3. Contractor shall assure additional dedicated space for vacuum-packed bag overwrap. At a Government proving ground, quick-disconnect device shall be tested to specifications.

L.4.4. M13 Decontamination Apparatus, Portable (DAP)Check/Test. To determine conformance to para L.1.5, vehicle shall be visually examined to ensure the contractor has adequate DAP stowage space in the cab (or, if outside cab, provisions of paragraph L.1.1 are met). At Government proving ground testing shall consist of DAP being mounted in an upright position using attaching bracket A-A-52513. Mounting hardware required for installation shall be supplied as outlined in paragraph L.1.1.

L.4.5. Chemical Protective Garments Check/Test. To determine conformance to para L.1.6, vehicle cab shall be checked to ensure adequate space is available for the following garments: NBC over-garment suits (4 ½ x 14 x 15 inches), one per crewmember; one spare over-garment suit per crewmember; NBC mask (l2 x 9 x 4 inches), one per crewmember; NBC Boots (11 x 5 x 4 inches), two per crewmember; NBC Hood (4 x 4 x 1 inches), one per crewmember. Restraining device for garments shall comply with paragraph L.1.3, or with device that is capable of restraining balance of garments when one or more is removed.

ANNEX M

SPECIAL-PURPOSE KITS

M.1. Common Kits/Items. All vehicles shall be configured to accept the following common kits/items. On-board electrical power shall be utilized where applicable. All kits shall be removable. The maintenance level required for kit installation shall not exceed the intermediate direct level unless otherwise specified in the installation instruction of that kit.

M.1.1. Arctic Kits. All FMTV variants shall be able to start and run without special arctic engine kits down to –25 ° F. Kits shall be provided to successfully start and operate at temperatures from –25 ° F down to –50 ° F. Special kits, including fluids, hoses, belts, battery systems or blankets may be required. If needed, these kits will be limited to a 30 minute prestart time requirement and will be furnished organic to each arctic bound vehicle. With kits installed, the vehicle will be driveable within 15 minutes of starting. Kit hardware shall be commercially available or available elsewhere in DOD. Kits shall not require special, non-DOD fuels. If fuel fired, kit hardware shall operate on all military diesel fuels and shall not significantly reduce engine life. Auxiliary cab heaters, if required, shall conform to MIL-PRF-62550E. These requirements also apply to cargo bay heaters for use in the cargo variants that transport soldiers. Personnel kits shall assure cab/body reference temperature of 41°F (as defined in MIL-STD-1472) are attained within one hour after the vehicle engine coolant system has been preheated, engine started, the operating temperature stabilized, and the vehicle engine operating at idle speed when operating in ambient temperatures of -50°F. The cab personnel kit shall assure that defrosting requirements of MIL-STD-1180 Requirement 103, Class III are met at -50°F.

CURRENT KITS

NOMENCLATURE	LMTV	MTV	LWB
ARCTIC CAB HEATER KIT	57K1971	57K1971	57K1971
ARCTIC CARGO-AREA KIT	57K4364	57K4364	57K4364
FLAME START KIT	57K4366	57K4366	57K4366
IMMERSION BLOCK HEATER KIT	57K4367	57K4367*	57K4367*

*Cargo models without MHE only

M.1.1.1. Insulated Enclosures. When the cargo compartment is used for transporting troops, the following insulated soft top kits are required to meet the Arctic's requirements.

NOMENCLATURE	LMTV	MTV	LWB
1. ARCTIC CARGO SOFT TOP KIT (CAMO)	57K1923	57K1924	57K1922
2. ARCTIC CARGO SOFT TOP KIT (WHITE)	57K1929	57K1933	57K1938

M.1.2. Cargo Cover Soft Top Kit. All cargo trucks and trailers shall be prepared to readily accept bows/supports and cover. The inside vertical height of the top shall be a minimum of 54 inches (137 cm) from the cargo bed, measured at the drop side. The covering shall be IAW MIL-PRF-32002. The rear panel shall have rapid roll-up capability actuated by a lanyard/rope pull from inside the cargo body, also accessible from the outside. Front and side panels will be capable of being rolled up and tied for ventilation. Storage space shall be provided at the forward edge of the cargo bed for ribs and posts when soft top is not in use.

NOMENCLATURE	LMTV	MTV	LWB	DUMP
1. CARGO SOFT TOP KIT (CAMO)	57K1898	57K1899	57K1900	57K1901
2. CARGO SOFT TOP KIT (TAN)	57K1925	57K1926	57K1935	57K1942
3. CARGO SOFT TOP KIT (WHITE)	57K1927	57K1931	57K1936	57K1941

M.1.3. 200 Amp Alternator Kit. A kit shall be provided, consisting of a 200 amp alternator and all items necessary to mount and make available 200 radio suppressed amps to the vehicle.

M.1.4. Machine Gun Ring Mount Kit. A kit IAW 57K1224 shall be provided to mount and support the machine gun ring mount (NSN: 10005-00-701-2810) for M60/M2 machine gun and MK19 grenade launcher applications. Location will be over the cab at either one of the non-driver crew positions and shall be readily accessible by crew members. Kit will allow firing of weapons in all directions in the absence of vehicle-mounted obstructions.

M.1.5. Rotating Amber Warning Kit. A portable kit IAW 57K1220 shall be provided which consists of a common military type 360° rotating type amber warning light, separate on-off type switch, mounting hardware, and electrical hook-ups to existing connectors. The warning light is exempted from EMI/EME requirements. Kit shall be designed for installation by the driver/crew within 10 minutes. Kit shall be designed to preclude amber warning light operation while the vehicle is in blackout condition.

M.1.6. Power Take-Off Kit. A Power Take-Off (PTO) kit shall be provided on all FMTV models when necessary to power on-board equipment. The PTO kit shall include all necessary components to power chassis-mounted truck hydraulic or mechanical equipment and shall provide a positive means to assure that the PTO cannot be accidentally engaged when vehicle is in motion.

M.1.7. Crane Kit. The Light Material Handling Crane kit for the LMTV shall be a manually (mechanical) and/or electrically operated side-mounted crane capable of loading/unloading a 1,500 lb. (654 kg) pallet from ground level to the cargo deck. The crane kit shall be detachable and capable of being placed in the general area of each corner of the cargo bed by two (2) crew members within 15 minutes without special tools.

M.1.8. Tiedown Kits. When the cargo deck is used for transporting either an S-280 Shelter, Tank and Pump Unit (TPU), or 500-gallon collapsible drum (s), the applicable tiedown kit as shown below is required.

NOMENCLATURE	LMTV	MTV	LWB
S-280 Shelter Tiedown Kit	57K4378	57K1949	57K1970
Tiedown Kit, Tank and Pump Unit - FMTV		57K1954	57K1955
Tiedown Kit, 500 Gal Collapsible Drums - FMTV		57K1956	57K1957

M.1.9. Troop Seat Kits. Troop seats shall be provided as an optional kit for standard cargo, long wheel base cargo, and dump trucks. Troop seats shall provide for at least 12 combat-equipped troops. The troop seat kit shall include an environmentally-protected means for two-way controlled-volume voice communication between troops in the cargo/dump body and those in the vehicle cab, operable independent of vehicle ignition status. Provisions for troop seats in MTV Cargo beds with MHE will not be required. To allow maximum use of cargo space and flexibility in load configuration, seats must be quickly stowed when not in use in sections suitable for 1-2 people. Troop seats shall be constructed of composite material (non wood or metal) conforming to MIL-PRF-62419. In the event troop seat assemblies are constructed of/with C or E channels, the channels shall be oriented

with the flat side of the channel facing the seating surface. When stowed, troop seats shall not accrue more than fair wear and tear.

M.1.10. Trailer Tank and Pump Unit (TPU) Tiedown Kits. The M1095 MTVT shall be capable of accepting mounting kits for both the 525-gallon and 600-gallon TPU sets. The kit numbers of the TPUs are 57K2018 and 57K2019 respectively.

M.1.11. Digitization Kits. All FMTV variants shall be capable of supporting digitization efforts by accepting both the Digitization Rack Kit, 57K2012, and the Digitization Electrical Kit, 57K2013, within the cab of the vehicle.

M.2. RESERVED.

M.3. RESERVED.

M.4. Common Kits/Items. To determine conformance to para M.1, all kits shall be verified.

M.4.1. Arctic Kit Test. To determine conformance to para M.1.1 and M.1.1.1, the vehicle Arctic Kits shall be tested at a Government proving ground for operation and performance requirements specified. During First Production Vehicle Inspection (para 4.3.1), kit installation shall be checked for proper fit and connection.

M.4.2. Cargo Cover Soft Top Kit Check. To determine conformance to para M.1.2, a Cargo Cover Soft Top Kit shall be installed and checked to the provisions and requirements specified. The kit shall be removed and checked for the storage requirements.

M.4.3. 200 Amp Alternator Kit. To determine conformance to para M.1.3, the Alternator Kit shall be installed and inspected. The alternator shall be tested with engine at idle and shall supply required amperage sufficient to maintain all electrical components and accessories for which the kit was designed.

M.4.4. Machine Gun Ring Mount Check. To determine conformance to para M.1.4, the vehicle machine gun ring mount shall be installed and inspected. During tests at a Government proving ground, the mounting structure shall not show any evidence of degradation, with the M2 machine gun mounted on the vehicle for 20,000 miles. At 7,500 miles, at 15,000 miles, and at the end of 20,000 miles, the machine gun mounted on the vehicle shall fire 5,000 continuous rounds from the M2 machine gun, with no degradation to the structure or any other portion of the vehicle. Any degradation to any component of the vehicle shall be cause for rejection.

M.4.5. Rotating Amber Warning Kit Check. To determine conformance to para M.1.5, the characteristics of the Rotating Amber Warning Kit shall be checked to the specified requirements. Component list and installation and operating instructions shall be checked for adequacy and correctness. A kit installation test shall be conducted to verify the 10-minute installation requirement.

M.4.6. PTO Kit Test. To determine conformance to para M.1.6, all FMTV models shall be checked for presence of Power Take-Off openings. The PTO shall be tested for the requirements specified and shall be checked for a positive means to assure against accidental engagement.

M.4.7. Light Material Handling Crane Kit Test/Check. To determine conformance to para M.1.7, the crane shall be tested for the maximum loading and unloading requirement specified. The kit shall be verified as to the detachability and placement requirements specified by two people within the time limits specified.

M.4.8. Tiedown Kits Check. To determine conformance to para M.1.8, the applicable kits shall be installed and checked to the provisions and requirements specified.

M.4.9. Troop Seat Check/Certification. To determine conformance to para M.1.9, the troop seats shall be installed and inspected. Cargo seats shall also be checked for stowing requirements. Prior to First Production Vehicle Inspection (para 4.3.1), the contractor shall certify that cargo seats are constructed for at least 12 combat-equipped troops (95th percentile males). During tests at a Government proving ground the installed troop seats shall be tested for operation and performance requirements.

M.4.10. Trailer TPU Tiedown Kits. To determine conformance to para M.1.10, the tiedown kits for both the 525-gallon and 600-gallon TPUs shall be installed on the MTVT and checked to the provisions and requirements specified.

M.4.11. Digitization Kit Checks. To determine conformance to para M.1.11, the Digitization Rack and Digization Electrical Kits shall be installed and inspected.

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ANNEX N

BASIC ISSUE ITEMS

N.1. Basic Issue Items. Basic Issue Items (BII) listed in drawings 12378420 and 12378411 and attaching hardware shall be furnished, unless noted, on all vehicles, except trailers, and considered as curb weight IAW section 6. A dedicated storage space shall be provided, and so the contractor shall establish and maintain weight data on each BII. The BII (except fire extinguisher and first aid kit) shall be secured in such a manner as to deter pilferage.

N.2. RESERVED.

N.3. RESERVED.

N.4. Basic Issue Item (BII) Check. To determine conformance to para N.1, the vehicle shall be checked for storage/attachment/accommodation of BII, as specified.

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ANNEX O

RESERVED

ANNEX P

RESERVED

ANNEX R

MTV TRUCKS, CARGO HIMARS Resupply Vehicle (RSV)

R.1.0 Cargo. The MTV HIMARS RSV shall be equipped with Material Handling Equipment (MHE) and shall meet all requirements of the main body of the FMTV performance specification (unless otherwise indicated) and all requirements of this annex.

R.2.0 General Requirements. Bed sides shall be configured so that they pivot outward to a vertically locked down position, (96 in width restriction waived for this requirement only) and shall be removable by two people (one desired) without tools. Removable components shall have recesses or specific handles to facilitate removal and handling. Storage space shall be provided, which does not infringe upon the bed area, for dropsides and posts when not in use. The cargo bed shall accept at all locations, with covering kit installed, loads up to 54 in. (137 cm) in height. Bed sides shall be a minimum of 18 in. (45 cm) above the floor of the cargo bed and be capable of withstanding lateral and longitudinal load forces as exerted by a 2500 lb. (1134 kg) pallet. The bed shall accept installation of the LMTV crane kit. The cargo beds shall meet Title 49 CFR requirements for highway ammunition shipment.

R.2.1 Standard Cargo Bed Tiedowns. The cargo body shall have tiedowns, conforming to MIL-STD-209H, except the cargo tiedown locations shall be in accordance with the technical data package provided with this solicitation. Tiedowns shall swivel 360^{o} and shall not protrude above the floor or side wall level when they are not in use. The rings must be accessible when the drop sides are in raised position. No portion of the bed shall fail when maximum rated load is placed on any opposing tiedowns.

R.3.0 Specific Requirements.

R.3.1 HIMARS RSV. The HIMARS RSV shall have a minimum internal bed length of 14 ft. and a minimum usable width (with sides up) of 90 in. and a total width (sides removed) of 96 in.

R.3.2 MFOM Payload. The HIMARS RSV shall be capable of transporting onboard up to two (2) Multiple Launch Rocket System (MLRS) Family Of Munitions (MFOM) launch containers having a maximum gross weight of 5100 lb. (2313 kg) each, or a combined total of 10200 lb. (4627 kg). The HIMARS RSV at GVW shall have the ability to tow a fully loaded MTV trailer having an identical payload of up to two (2) MFOM launch containers. The HIMARS RSV shall not transport MFOM launch containers as payload by rail.

R.3.3 MFOM Tiedowns and Positioning Kit. The HIMARS RSV cargo bed shall be capable of accepting the MFOM ammunition launch container(s) tiedown and positioning kit IAW Annex M. This kit shall provide for readily locating two (2) MFOM launch containers and securing of these containers for normal transportation per the requirements of the FMTV performance specification. The tiedown

locations shall be capable of accepting cargo tiedown straps (NSN 5340-01-204-3009, or equivalent), and conforming to MIL-STD-209. The tiedowns shall fold down flat when not in use and have a minimum 5100 lb. (2313 kg) rated tensile strength.

R.3.4. HIMARS RSV Crane. The HIMARS RSV shall have Material Handling Equipment (MHE), and shall meet all requirements in the FMTV performance specification. The MHE shall include a fully hydraulic constant torque 94,400 ft-lb. (127,983 N-m) crane powered by vehicle's power take-off (PTO). The crane shall be operated by controls at the side of the vehicle, and a remote control unit shall be provided. The crane for road and air transportability shall not exceed 96 in. (244 cm) width and shall not extend beyond the chassis frame nor below 30 in. (76 cm) above the ground. The design of the complete crane assembly with mounting hardware per DIN 15018 shall be such that when installed and during operation the unit stress on any member shall not exceed the margin of safety provided in SAE J1063 when tested accordingly. All exposed hydraulic lines and fittings shall be shielded to preclude damage when the crane is interfacing with other vehicles, and ancillary equipment specified herein, or caused by terrain or natural obstacles. Crane design shall provide for smooth and quiet operation, ease and flexibility of operation, and versatility of performance. Crane shall comply with Articulating Boom Cranes, ANSI/ASME B30.22. A flexible/swiveling 1 foot (31 cm) minimum interface is required between boom and hook to facilitate attachment of the load, without precise positioning of the boom. Vertical lift of load is required. Crane shall be fully operable without movement of other on vehicle equipment, such as, spare tire/carrier assemblies. The crane shall include a minimum of two removable work lights with sufficient power cord to illuminate all areas within the span of the crane boom. These lights shall require specific override action to activate during the blackout mode. The crane boom shall have a fixed location for stowage of the hook assembly. The crane shall be designed and manufactured to withstand a minimum of 60,000 full operation cycles at maximum working load without structural fatigue failure.

R.3.4.1 Location & Capability. The crane shall be mounted on or near the longitudinal centerline of the truck to the rear of the cargo bed. It shall be capable of independent loading and unloading the MFOM weapons listed in Table I of MIS-PRF-35480 and an MLPA trainer, from the ground, a HIMARS Resupply Vehicle and a HIMARS Resupply Trailer. The crane shall be capable of loading or unloading weapon pods with any combination of 0-6 rockets in the pod. It shall be capable of:

a. Lifting 5100 lb. (2313 kg) at 16 ft. (487 cm) lift radius to allow pick up of an empty MFOM launch container and MLPA trainer, while using MFOM Hoist Assembly Adapter IAW 11508999 (NSN 1055-01-137-4441) or other cargo. The crane shall be capable of off-loading an empty MFOM launch container, and MLPA trainer or other cargo to either side of the RSV or RST, out to the maximum reach.

b. Lifting 5400 lb. (2454 kg) at 12 ft. (366 cm) lift radius and placing it onto the XM142 HIMARS launcher, HIMARS RSV, and HIMARS

RST. This represents a fully- or partially-loaded MFOM launch container lifted while using the MFOM Hoist Assembly Adapter IAW 11508999 (NSN 1055-01-137-4441). The crane shall be capable of off-loading a single fully- or partially-loaded MFOM launch container from a RSV, the XM142 HIMARS Launcher, and RST to either side of those vehicles. Maximum crane lift capacity shall be 10,000 lb. (4535 kg.) at 7 feet (213 cm) lift radius.

c. The crane shall have a minimum working traverse of 370 degrees with a rated capacity of 125% of static capacity at inner and outermost reach. The traverse overlap shall be toward the rear of the vehicle.

d. The crane dead weight without mounting parts, pump, and oil shall not exceed of 3700 lb. (1678 kg) desired.

e. The crane shall operate in ambient temperature ranges of -40°F to +120°F (-40°C to +49°C) without preparation or any applied kits. A warm-up cycle for the crane is acceptable.

f. The crane shall be designed to operate on a 7% slope at maximum working load in any slewing angle position without leveling the vehicle.

R.3.4.2 Stabilizing System. Outriggers shall be fully hydraulically operated and mounted directly to the crane base or chassis frame of vehicle. The outrigger legs shall be independently hydraulically controlled for leveling the vehicle on slopes up to 5% oriented in any direction. The outrigger legs shall use check valves to lock in place when extended in order to stabilize the vehicle at all times. The outrigger legs when extended shall have creep of not more than 1 in. (2.5 cm) in 30 minutes with truck and crane boom at maximum load, boom at maximum extension. The outrigger legs shall positively lock when in stowed position. The stabilizing system shall be designed such that when operating an unloaded truck, with tires at highway pressure, crane at maximum capacity, the system tipping moment shall not exceed 85% of the system righting moment, when tested in accordance with SAE J765, except that the test shall occur on a 7% lateral slope without leveling the vehicle. The stabilizing system safety requirements shall be in accordance with those defined in ANSI/ASME B30.5 and /or ANSI/ASME B30.22. The landing pads shall be capable of holding and stabilizing the crane at maximum load on level ground with soil strength conditions of 60 Rating Cone Index (RCI) at the 6 to 12 in. (15 to 30 cm) depth soil layer. If not designed to be attached to the landing legs during vehicle movement, the pads shall be quickly and easily removed and stowed on vehicle by the full range of Army users.

R.3.4.3 Crane Hydraulic System and Controls. Integrated within the hydraulic system shall be the necessary hydraulic pump, cylinder(s), strainer(s), filter(s), reservoir(s), pressure relief valve(s), and all necessary lines, lockout(s), restrictor(s), and control valve(s) to insure positive and safe control of all operations and to provide protection in the event of a hydraulic power failure. The hydraulic filters and strainers shall be located to provide direct access and to allow removal without causing damage to the vehicle. By-

passes shall be furnished where necessary to protect filters during cold temperature operation. A means shall be provided for bleeding all air trapped in the hydraulic system. A means shall be provided to lower any load to the ground in the event of a hydraulic system or control failure. All cylinder rods that are exposed during operations shall have a hard chromium plating with a crack-free thickness sufficient to pass the porosity test of QQ-C-320. No chromium plating or other surface violating camouflage considerations shall be exposed except during crane operation. All high-pressure hydraulic hoses and fittings shall be capable of withstanding a bursting test pressure of four times the working pressure and proof pressure of at least two times the working pressure. High-pressure hydraulic hoses shall be capable of operation on OE-10, OE/400/-10, Grade 10 oil conforming to MIL-PRF-2104 and OEA under Arctic Conditions. There shall be no leakage of hydraulic fluid past couplings or seals at maximum load and speed within the operational conditions cited herein. Hydraulic circuitry shall be provided which shall enable the crane to maintain vertical downward creep not to exceed 1 in. (2.5 cm) thirty (30) minutes after stabilization with maximum load at maximum lift radius (min 16 ft, 487 cm). Directional control valves shall be designed to permit operating a minimum of two functions simultaneously. The crane control actuation directions shall comply with Table R-I (as applicable):

TABLE R-I

Crane Action	Vertically Mounted Control	Horizontal Mount
Inner Boom Up	Move Knob Up	Toward Operator
Inner Boom Down	Move Knob Down	Away From Operator
Outer Boom Up	Move Knob Up	Toward Operator
Outer Boom Down	Move Knob Down	Away From Operator
Boom Extension In	Move Knob Down	Away From Operator
Boom Extension Out	Move Knob Up	Toward Operator
Crane Swing CCW	Move Knob Up	Toward Operator
Crane Swing CW	Move Knob Down	Away From Operator
Diverter Control (Outrigger)	Move Knob Down	Away From Operator
Diverter Control (Crane)	Neutral Position	Neutral Position
Crane Post Tilt Down	Move Knob Down	Away From Operator
Crane Post Tilt Up	Move Knob Up	Toward Operator
Left Outrigger Extension	Move Knob Down	Away From Operator
Left Outrigger Retraction	Move Knob Up	Toward Operator
Right Outrigger Extension	Move Knob Down	Away From Operator
Right Outrigger Retraction	Move Knob Up	Toward Operator
Outrigger Pad Up	Move Knob Up	Toward Operator
Outrigger Pad Down	Move Knob Down	Away From Operator

Table II does not define mounting position or location. Vertical and horizontal nomenclature indicates direction of control knob movement.

R.3.4.4 Fixed Operator's Station. All crane controls and

indicators shall be located within clear view and easy reach of the operator at the fixed operator's station and shall be readily accessible under all conditions of operation. Each functional control, both crane and outrigger, shall be of the deadman type automatically returning to the neutral position should the operator inadvertently or intentionally release the control. All controls governing a function (rotation, boom extension and retraction, vertical lift and drop) shall be proportionately variable. An emergency shut down capability shall exist and be designed such that when activated, all crane functions cease. Additionally, a master crane power switch shall be provided and designed such that the crane operational mode can be positively controlled either by the operator station, remote control unit, or all power to the crane is removed. All controls shall be clearly marked as to use and function. Control spacing and size shall be such that they are operable by an operator wearing arctic mittens. Controls shall be waterproof and performance shall not be diminished when tested in accordance with MIL—STD-810, Method 506.4 Procedure I. Controls shall be protected from weather and accidental damage.

R.3.4.5 Remote Control Unit. The remote control unit shall operate the spools of the directional (crane functions) control valve at both a normal and slower operational speed mode. Remote control shall be proportionally variable, provided with an emergency shut down capability and designed such that when activated, all crane functions cease. The remote control unit shall also have a positive interlock switch(s) or mechanism(s) for application of power and normal operational mode. Indicator(s) shall be provided to indicate normal operations of the remote control unit. It shall not leak or have diminished performance when tested in accordance with MIL—STD-810, Method 512.4, Procedure I. The remote control unit shall be shock resistant IAW MIL—STD-810 Method 516.5, Procedure I and operable at any location within a minimum of 25 ft (7.6 m) distance of the crane base, either wireless or cabled. Remote control connection shall be at the rear of the cargo box. The remote control unit weight shall not exceed 10 lb. (4.5 kg) and be designed in accordance with MIL—STD-1472. A shoulder strap shall be provided with each remote control box. The controller shall have multiple functions to match control levers on fixed control except for the post and outrigger controls. A stowage box shall be provided for the remote control unit that shall be lockable with a standard padlock, padded to take shock loads, and waterproofed against impingement of water from a 5/8 in hose at 80 psi from any direction.

R.3.4.6 Transportability. The vehicle including crane shall meet all FMTV transportability requirements without preparation.

R.3.4.7 Overload Shutdown System. The crane shall be provided with overload protection, which shall preclude structurally overloading the crane. The system shall initiate shutdown of crane functions, except for functions which would reduce or alleviate the overload condition when any crane movement causes the moment on the crane to exceed 110% of the crane's rated capacity. Shutdown shall be completed within a period of time such that a load exceeding 110% of the crane's rated capacity cannot be lifted to a height of more than 18 inches above ground level when lifted at maximum crane boom extension and reach. Loads of more than 150% of the crane's rated capacity shall not

leave the ground.

R.3.4.8 HIMARS RSV MHE Reliability. The crane shall demonstrate a reliability of 5,500 Mean Cycles Between System Abort (MCBSA) and 3,055 Mean Cycles Between Essential Function Failure (MCBEFF) at a point estimate.

R.3.4.9 Signs. Shall be in black characters on a background field of green.

R.3.4.9.1 Crane Instruction Plate. Two crane operating instruction plates shall be furnished conferment to **A-A-50271** Composition A, Class II, one at the fixed control station, and appropriate operating instructions on the remote control unit.

R.3.4.9.2 Outrigger Leg Sign. One sign conforming to **A-A-50271** Composition A, Class II, on 1 in. lettering, shall be placed next to the control station stating CAUTION, OUTRIGGER BEAMS MUST BE FULLY EXTENDED AND OUTRIGGER LEGS IN PLACE BEFORE LIFT CAN BE MADE.

R.3.4.9.3 Load Capacity Sign. A load capacity sign shall be visible from the control station conforming to **A-A-50271** Composition A, Class II.

R.3.5 Ladder. A ladder, with stowage hardware and mounting location to access the bed when the MFOM launch containers are loaded, shall be provided.

R.3.6 Electromagnetic environments. The HIMARS RSV with MHE shall meet the applicable requirements for electromagnetic emissions and susceptibility in accordance with MIL-STD-461. The HIMARS RSV with MHE shall also meet the subsystem compatibility requirements in MIL-STD-464 and ATPD-2131A (Paragraph 3.2.1.12.1). All maintenance aids and or maintenance equipment shall meet the requirements as specified herein.

R.3.6.1 Electromagnetic radiation hazard (EMRH). The HIMARS RSV with MHE exposed to the EMRH levels in Table , shall not be adversely affected.

R.3.6.2 Electromagnetic radiation operational (EMRO). The HIMARS RSV with MHE shall meet the performance requirements when subjected to the EMRO levels of communication and radar equipment as listed in Table R-II.

Table R-II. Electromagnetic environment requirements

EMRH ENVIRONMENT [1]		
Frequency (MHz)	Vertical Fields (V/m)	Horizontal Fields (V/m)
0.1 to 2.0	50	-
2.0 to 32	100	-
32 to 100	100	100

100 to 1000	200			200		
1000 to 12400	200			200		
EMRO ENVIRONMENT, COMMUNICATION EQUIPMENT [1]						
Frequency (MHz)	Vertical Fields (V/m)			Horizontal Fields (V/m)		
	CW	AM[2]	FM	CW	AM[2]	FM
0.1 to 2.0	25	25	-	-	-	-
2.0 to 32	50	50	-	-	-	-
32 to 100	50	50	50	50	50	50
100 to 500	25	25	-	25	25	-
500 to 1000	50	50	-	50	50	-
EMRO ENVIRONMENTS, RADARS						
Frequency (MHz)	Fields (V/m)					
	Peak	Average (PM)				
400 to 9300	5000	50				
9300 to 18000	2500	25				

[1] EMRH and EMRO Communications equipment fields are rms
[2] Amplitude Modulation (AM) shall also include 400 Hz and 1000 Hz.

ANNEX R

R.4.0 General Requirements Check. To determine conformance to R.2.0, the MTV HIMARS RSV variant shall be checked for the requirements specified.

R.4.1 Standard Cargo Bed Tiedown Test/Certification. To determine conformance to R.2.1, the MTV HIMARS RSV variant shall be inspected for location and 360 degree operation of tiedowns in accordance with the specified requirements. Tiedowns shall be tested, in vehicle, to the minimum rated tensile strength without deformation to the tiedown or attachment members. Prior to First Production Vehicle Inspection (FPVI), the contractor shall certify that the cargo tiedowns meet the requirements of MIL—STD-209.

R.4.2 HIMARS RSV, Check. To determine conformance to R.3.1, the MTV HIMARS RSV variant shall be inspected to the requirements specified.

R.4.3. MFOM Payload, Test. To determine conformance to Paragraph R.3.2, the HIMARS RSV shall be operated at the maximum payload and maximum towed load to insure correct operations under all conditions per the requirements of this annex and the main body of the FMTV performance specification.

R.4.4 MFOM Tiedowns and Positioning Kit Certification. To determine conformance to Paragraph R.3.3, the contractor shall certify that the complete MFOM Tiedown and Position Kit meets the requirements specified in Annex M and the design complies with MIL-STD-209 prior, to First Production Vehicle Inspection.

R.4.5 HIMARS RSV Crane Check/Test/Certification. To determine conformance to Paragraph R.3.4 the MTV HIMARS RSV variant with material handling equipment (MHE) shall be operated using all controls and checked for hydraulic system leaks. None are allowed. The crane shall be checked for location of controls; shielding on all exposed hydraulic lines, fittings, and specified ancillary equipment; presence of a flexible/swiveling one (1) foot interface between boom and hook; and presence of a fixed location for stowage of the hook assembly. The MHE, during testing at Government proving ground, shall be tested periodically for 94,400 ft-lb. (127,983 N-m) hydraulic constant torque and operational requirements. Prior to First Production Vehicle Inspection, the contractor shall certify that the complete crane assembly meets or exceeds the margin of safety provided in DIN 15018 and SAE J1063, that the crane design complies with ANSI/ASME B30.22, and that the crane withstands 60,000 full operational cycles at maximum load without any signs of fatigue failure.

R.4.5.1 Location & Capability Check/Test/Certification. To determine conformance to Paragraph R.3.4.1, the crane shall be checked and tested during FPVI, Control testing and testing at a government proving ground for the location and operational requirements specified.

Prior to First Production Vehicle Inspection, the contractor shall certify the crane complies with all federal OSHA safety standards and can operate at the specified temperature range. During government proving ground testing, the crane shall be tested for a minimum of 1,000 cycles. During Control testing, the crane shall be operated for a minimum of 40 cycles. During QCI, 10 cycles shall be conducted. The remote and operators station shall be used during this inspection. One cycle for government proving ground testing is defined as raising and lowering four 5100 lb. (2313 kg) weights up to maximum reach from four different points on the ground on one side of an RSV/trailer combination and placing two (2) each upon the RSV and trailer. Then returning all four (4) weights to the ground opposite the side they were originally lifted from. One cycle for Control test and QCI is defined as raising and lowering a 5100 pounds (2313 kg) weight at maximum reach at three different points during a complete traverse of the crane. The weight shall be raised five (5) feet from the ground during each lift without touching any part of the vehicle (reference diagram in ANNEX A, paragraph A.4.4.1).

In the event the vehicle is not shipped within 30 days of the QCI, another 10 crane cycles shall be conducted prior to vehicle shipment. The crane and vehicle hydraulic systems will be inspected for leaks, chaffing, and proper operation of the controls during this testing.

R.4.5.2 Stabilizing System Check/Test/Certification. To determine conformance to Paragraph R.3.4.2, the outriggers shall be checked for operation, location and safety switch requirements specified. During Control Tests (Paragraph 4.5) the outriggers shall be tested for independent control of vehicle leveling on slopes up to 5% in any direction, check valve operation, and creep requirement, at maximum crane boom load and at maximum boom extension. Prior to First Production Vehicle Inspection, the contractor shall certify the stabilizing system tipping moment does not exceed 85% of the system righting moment when operating the truck unloaded, with tires at highway pressure, and crane at maximum capacity while tested in accordance with SAE J765 (the test shall be conducted on a 7% lateral slope without leveling the vehicle). Prior to First Production Vehicle Inspection the contractor shall also certify that the stabilizing system safety requirements are in accordance with ANSI/ASME B30.22.

R.4.5.3 Crane Hydraulic System and Control Tests. To determine conformance to Paragraph R.3.4.3, the hydraulic system shall be tested for safe control of operations during a simulated hydraulic failure, for direct access to hydraulic filters and strainers without causing damage to the vehicle, for protection of filters during operation in cold temperatures, for bleeding trapped air in the hydraulic system, for lowering loads during a hydraulic or control system failure, for the creep requirement specified, for the control valve functions specified, and for the crane control actuation directions specified. The crane shall be checked periodically during testing for hydraulic fluid leakage. None allowed. The contractor shall submit test documentation at FPVI showing compliance to the chromium plating requirement, to the hydraulic hose(s) burst and proof test requirements, and hose compatibility to the oils specified.

R.4.5.4 Fixed Operators Station Check/Test. To determine conformance to Paragraph R.3.4.4, during testing, the fixed operators station shall be checked for the operational requirements specified. The contractor shall submit test data during FPVI that the controls are waterproof and performance is not diminished when tested in accordance with the standard specified

R.4.5.5 Remote Control Check/Test/Certification. To determine conformance to Paragraph R.3.4.5, the remote control shall be checked for operation, for leakage, for operational location distance specified, for weight specified, and for presence of the stowage box specified. During Control Tests (Paragraph 4.5) the remote control shall be tested for proportional variability, emergency shutdown capability, cessation of crane functions and multiple functions specified. Shock, vibration, waterproofness and EMI shall be part of the Component First Article Testing (CFAT). During testing at a government proving ground, the remote control shall be tested for HAEMP, and EMI requirements. Prior to First Production Vehicle Inspection, the contractor shall certify to the standards specified which includes shock, vibration, waterproofness and EMI.

R.4.5.6 Transportability Test. To determine conformance to Paragraph R.3.4.6, the HIMARS RSV MHE (crane) shall be tested for the FMTV transportability requirements specified.

R.4.5.7 Overload Shutdown System Test. To determine conformance to Paragraph R.3.4.7, the crane shall be tested for the overload shutdown requirement specified.

R.4.5.8 HIMARS MHE Reliability . When required by contract, the crane shall demonstrate the required reliability (ref. R.3.4.8) during government testing IAW Table II of the ATPD (Base Document) and Table R-III of this annex (Annex R).

R.4.5.9 Signs Check. To determine conformance to Paragraph R.3.4.9 (inclusive), the crane shall be checked for all instruction plates, signs, markings, and angle indicator requirements.

R.4.6. Ladder Certification/Verification. During FPVI the contractor shall certify that the Ladder complies with the requirements of Paragraph R.3.5. During inspection the ladder shall be checked for stowage and mounting location specified.

R.4.7 Electromagnetic Environmental Effects (E3) Testing. To determine conformance to Paragraph R.3.3.10, the HIMARS RSV shall be tested. This will be done by the prime contractor as a part of the overall system-level E3 testing.

R.4.7.1 Electromagnetic radiation hazard (EMRH) Testing. To determine conformance to Paragraph R.3.3.10.1, the HIMARS RSV shall be tested.

R.4.7.2 Electromagnetic radiation operational (EMRO) Testing. To determine conformance to Paragraph R.3.3.10.2, the HIMARS RSV shall be tested.

TABLE R-III

CLASSIFICATION OF INSPECTIONS AND TESTS

The inspections/tests referenced in Table R-III (inclusive) may be modified at the discretion of the Government by the deletion or addition of examinations to assure adherence to specification/contractual requirements. A "+" next to the text means it is a Certification Requirement. *QCI testing maybe performed at vehicle curb weight (VCW).* The Government has the option of performing or not performing any individual test (PQT and FPT) listed below during Government testing.

TEST LOCATION

First Production Vehicle Inspection (FPVI)	Place of Manufacture
Production Qualification Test (PQT)	Government Proving Grounds
Quality Conformance Inspection (QCI)	Place of Manufacture
Control Test (CT)	Place of Manufacture
Follow-on Production Test (FPT)	Government Proving Grounds

ANNEX R

TITLE	RQMTS	METHOD	FPVI	PQT	QCI	CT	FPT
General Requirements	R.2.0	R.4.0	X	X	X	X	X
Standard Cargo Bed Tiedowns	R.2.1	R.4.1	X+	X		X	X
HIMARS RSV	R.3.1	R.4.2	X	X	X		X
MFOM Payload	R.3.2	R.4.3	X	X	X		X
MFOM Tiedown and Positioning Kit	R.3.3	R.4.4	X+	X		X	X
HIMARS RSV Crane	R.3.4	R.4.5	X+	X	X	X	
Location & Capability	R.3.4.1	R.4.5.1	X+	X	X	X	
Stabilizing System	R.3.4.2	R.4.5.2	X+	X		X	X
Crane Hydraulic System & Control	R.3.4.3	R.4.5.3	X+	X			X
Fixed Operator's Station	R.3.4.4	R.4.5.4	X	X		X	X
Remote Control Unit	R.3.4.5	R.4.5.5	X+	X		X	X
Transportability	R.3.4.6	R.4.5.6	X	X			X
Overload Shutdown System	R.3.4.7	R.4.5.7	X	X		X	X
HIMARS RSV MHE Reliability	R.3.4.8	R.4.5.8		X+			

Signs	R.3.4.9 (Inclusive)	R.4.5.9	X	X	X	X	X
Ladder	R.3.5	R.4.6	X+	X	X	X	X
EM Environments	R.3.6	R.4.7		X			
EMRH	R.3.6.1	R.4.7.1		X			
EMRO	R.3.6.2	R.4.7.2		X			

ANNEX S
LOAD HANDLING SYSTEM (LHS)

S.1.0 Load Handling System (LHS). The MTV LHS model shall meet the requirements of the main body of the FMTV System Specification (unless otherwise indicated) and all requirements of this annex. The FMTV LHS shall meet the achieved demonstrated capabilities of an MTV cargo model type variant as documented in the latest System Evaluation Report (SER).

S.2.0 General Requirements. The Load Handing System (LHS) variant with companion trailer shall transport ISO compatible shelters and other loads as defined by the specific requirements of this ANNEX. The installed weight of the complete LHS comprising the Hook Arm Assembly (HAS), Rear LHS assembly, Load Handling Unit Lift Frame (LHULF) and LHULF stowage shall be minimized in order to maximize the Payload handling capability of the FMTV. All LHS systems (e.g. mechanical, electrical, hydraulic etc.) shall be compatible with the systems on the FMTV. At GVW, the vehicle system shall not exceed rated load requirements & performance capabilities for vehicle subsystems i.e. axles, tires, wheels, suspension system, driveline, brakes, etc. Suitable interface drawings shall be provided to allow for proper mating with the truck chassis and related systems.

S.2.1 Definitions and descriptions of LHS components. The following definitions apply.

S.2.1.1 Payload modules.

Flatracks (FR)	M1 and M1077 Flat racks. 20ft x 8ft pallets with interface and locking dimensions in accordance with STANAG 2413.
CROP	M3 & M3A1 Flat Racks that fit inside an ISO container (Container Roll in/Out Platform)
ISO containers	Standard 20ft long ISO compliant container that may be of various heights (generally from 8’ to 8.5’). Handling of these modules requires the LHS (below) to include additional assemblies beyond those needed for the STANAG2413 interface.
Medical Shelters	20 ft. long Expandable Shelters of Aluminum, used by the Army Medical Units.

S.3.0 Specific Requirements.

S.3.1 Load handling system (LHS). A complete mechanical/hydraulic system shall be provided that loads/unloads payload modules on an FMTV chassis. The LHS shall include all required sub assemblies, including those

required for interfacing with 20ft ISO containers, medical shelters and other payload modules. Some of the key features of the LHS are the Hook Arm System (HAS), The Load Handling Unit (LHU), Rear Roller Assemblies, and controls.

S.3.1.1 Hook-arm system (HAS). The hydro/mechanical arm assembly shall be provided with the geometry required to load/unload payload modules. This assembly shall be complete with operating/control systems and requires a chassis mounted rear assembly to guide payload modules during the load/unload cycle.

S.3.1.2 Rear LHS/
LHU Rollerbed Assemblies. Transversely mounted rear rollerbed assemblies shall be provided at the rear of the chassis to permit the operator to configure the LHS/LHU that provides collecting/guiding capability for all of the payload modules described above. For the ISO module, twistlocks are required to lock the rear of the container for transit. A means of restraint for the front of the ISO module is required. Similarly the LHS/LHU rear roller assembly shall be easily configurable by the driver between the STANAG 2413 & ISO configurations.

S.3.1.3 Load Handling Unit (LHU). A LHU shall be provided which represents all assemblies for container handling including the rear assembly. The assembly shall have an interface which allows the Load Handling Unit Lift Frame (LHULF) to be transferred to/from the HAS when it is reconfigured between the payload modules. The LHULF is the part of LHU which provides the interface between the HAS & the end face of the ISO payload module. It shall be stowed on the vehicle at all times and shall not interfere with the loading/unloading of Flatracks. Also in air transport it shall be held securely in a way that no part of the Hook-Arm or the LHU is higher than the maximum height approved for loading/unloading the vehicle in a C130 aircraft, or exceeds the 96 inches width requirement. The FMTV LHS LHU design shall have the chassis frame clearances required for the FMTV LHS to tow an LHS trailer and also have the ability to load and unload payload modules to and from the LHS trailer.

S.3.1.4 Load Handling Unit Lift Frame(LHULF). The interface between the end face of a 20ft ISO container shall be provided by the LHULF which is a structure that shall be carried on the HAS and fitted with guides/locating assemblies and locks to securely attach it to the ISO module. It shall weigh no more than TBD pounds. The frame shall be adaptable to incorporate both 8ft & 8.5ft modules (IC & ICC). The LHULF assembly shall be stowed on the vehicle and may be located in a stowage assembly behind the cab when not being used to load a container or when attached to a loaded container. Utilizing the HAS, as required, the LHULF shall be readily transferable to/from the stowed position and the operational position for handling 20 ft ISO modules by one operator. During the load cycle, the frame is lifted onto the front of the container by the HAS and is located and locked onto the ISO corner castings. The LHULF shall be self-adjusting to suit the container height. A LHULF is used to lift the front face of the container onto the pre-configured roller beds and moved forward to the ready for transit position. The LHULF is left on the container during transit ready for the unload procedure at the vehicles destination. The LHU shall also have the ability to move the container rearward (if needed) after off-loading while the container is in

contact with the ground, this may be needed for adjusting the position of the container.

S.3.1.5 Lifting Frame Stowage Assembly. The stowage assembly may be mounted in front of the hook arm on a sub frame and used to store the LHULF when not in use. Mechanisms shall be in place to guide the LHULF into stowage and securely hold the LHULF when stowed. The system shall include safety interlocks within the cab to ensure operator safety by preventing other operations when stowage functions are being carried out from the ground operating position.

S.3.1.6 Cab Mounted Components. A cab control box shall be designed and mounted into a free space within the cab and shall meet the current FMTV specs for similar control systems. The integrated unit mode switch shall control all functions of the load handling system, with switch positions for automatic flatrack mode, automatic container mode, lifting frame stowage mode and manual modes. Integral warning lights on the unit shall illuminate to give warnings when the system is not safe to operate, the oil filters are clogging, the oil temperature is too high, and the PTO is engaged. (Some of these items may already be on the control panel of the truck in which case these do not need to be duplicated.) The cab control box shall contain all of the components that form the logic of the programmable automated control system. The system shall receive the signals from the sensors and interpret them to ensure that safe operations are carried out and warn if the payload module is not in the fully loaded “safe for transport” position.

S.3.1.7 Operating circuits & control system. The operating circuits and control system(s) shall be designed such that it allows the vehicle driver to operate the primary controls for pick-up and release of the payload modules while seated in the driving position within the vehicle cab. A means shall be provided to release the hook-arm of the LHS from the flat-rack in the event of a hydraulic system or control failure.

S.3.1.8 Alternate/Back-up mechanism for Emergencies. The LHS/LHU shall incorporate a manual mechanism that permits lowering safely the loaded flat-racks/ISO containers in the event of system electric/hydraulic failure.

S.3.2 Loading/Unloading Requirements. The LHS vehicle system shall Self-load/off-load payloads from/down to the ground with the flat-rack/ISO shelter base 1 foot below ground level required (more Desired). Self-load/off-load payloads from/onto uneven ground having a side slope/ longitudinal slope 5 degrees (10 degrees Desired). Self-load/off-load payloads from an approach angle of +/- 10 degrees for the flat-rack or +/- 5 degrees for the shelter (20 degrees Desired), from the vehicle vertical and/or horizontal plane. The LHS system shall automatically self-center and secure the flat-racks and ISO shelters/containers to the prime mover during the loading operation under all specified terrain profiles for transport over all mission profiles of the vehicle. Automatically securing of the ISO shelters/containers to the prime mover is an Objective. Incorporate into the LHS system a safety mechanism with a 10% overload allowance that prevents the operator from picking up an overloaded flatrack/shelter/container with an in cab overloading warning.

S.3.2.1 Using a crew of one soldier (without dismounting-Objective), self-load/off-load and secure to the truck and LHS companion trailer and

transport over the full vehicle mission profile 20-foot long ISO shelters/containers of 8 ft and 8.5 ft height, and Medical Shelters conforming to ISO 668 Type 1CC and 1C, weighing 7.5 tons (8.5 tons Desired) without the use of a flatrack. It is acceptable for the driver to come out of the cab for some simple connections to the ISO Containers. When handling the ISO payload module the weight of the LHULF is not included in the nominal gross payload. On-vehicle-stowage of necessary interface equipment is required and shall not exceed 96 inches overall width when stowed. One operator shall accomplish stowage in no more than 25 minutes (15 minutes Desired) using on vehicle BII. Fully integrated container interface equipment is the Objective.

S.3.2.2 Self-load/off-load, or transfer and secure to the vehicle, using a crew of one soldier without dismounting, and transport over the full vehicle mission profile the following payload modules: M1, M1077, and STANAG 2413 flatracks, the M3 Container Roll On/Off Platform (CROP) flatrack (i.e. NATO Standard demountable cargo bed), weighing not less than 2 tons with not less than 5 tons of any class of supply as payload. All necessary assemblies or equipment to perform these operations are to be carried on the vehicle. Payload shall be maximized to take advantage of rated LHS vehicle capability. USADACS certification is required for Class V transport.

S.3.2.3 Loading/Unloading Time. The time for loading/unloading a fully loaded flatrack, to or from the truck shall not exceed 1 minute. The time for transferring a payload module to or from the LHS trailer shall not exceed 1 minute for the Flatrack Modules and 7 minutes for the ISO Module. The time shall begin when the LHS is activated, and shall end when the flatrack/ISO Module is secured to either the truck or the LHS trailer. Time taken to back the truck up and attach to the LHS trailer shall not be considered for this requirement.

S.3.2.4 Be designed so the vehicle driver, while seated in the driver position using vehicle mirrors, can operate the primary controls for pick-up and release of flatracks/ISO containers. It is acceptable for the driver to exit the cab to perform simple connections to the ISO container. The vehicle shall also incorporate auxiliary LHS controls external to the cab to permit full LHS operation by an operator or maintainer standing outside the vehicle.

S.3.2.5 LHS vehicle loading height. No portion of the LHS, flat-rack, or any portion of the vehicle, shall exceed 177.2 inches (4.5 M) of overall height when loading or unloading a flat-rack.

S.3.2.6 Incorporate a manual mechanism that permits lowering safely the loaded flat-rack/ISO containers in the event of system hydraulic failure.

S.3.2.7 Flatrack Locking. The LHS shall automatically guide, center, and secure a flat-rack to the vehicle such that during rough terrain operations the flat-rack remains secure. There shall be a means to manually unlock the flat-rack from the vehicle in the event of a hydraulic system or control failure.

S.3.3 Transfer conditions. The HAS shall be able to transfer the payload modules specified to/or from the LHS trailer, or a hard surfaced loading dock that has its top face at such a level that the HAS locus of operation will permit the transfer. (DESIRED)

S.3.4 LHS Overload. Incorporate into the LHS hydraulic system a safety mechanism(with a 10% overload allowance) that prevents the operator from picking up an overloaded payload module. The LHS overload protection system shall protect the LHS, truck, trailer, and flatrack from permanent damage or deformation while loading/unloading uniformly distributed payloads greater than that allowed in the automatic mode. There shall be an overload warning light located in the cab, in plain view of the driver. The LHS warning light shall indicate activation of the overload protection system (the overload protection system may be deactivated for lift capability verification).

S.3.5 Retrograding. Shall be capable of retrograding stacks of empty LHS compatible flatracks to the payload limit of the vehicle.

S.3.6 Towing Requirements. Tow a FMTV-LHS companion trailer loaded with a payload identical to that of the LHS truck. The prime mover shall load/off-load this payload onto/off-of the trailer using the prime mover LHS. The vehicle towing device and supporting structure shall be compatible with the towed load requirements. The towing device shall incorporate a capability that permits a single operator to hook up to any FMTV compatible lunette style trailer. This includes the trailer lunette offset up to 6 to 9 inches laterally from the center line of the truck/pintle hook and up to 12 inches minimum, 18 inches maximum aft of the towing position. Hook-up shall be completed in a single dismout/remount sequence.

S.3.6.1 Turning (FMTV-LHS truck-trailer combination). The FMTV-LHS truck with LHS trailer combination shall be capable of negotiating a 90 degree intersection of two 24 foot wide roadways, wall-to-wall, in a single pass (18 foot wide desired).

S.3.7 On-road requirements. Be capable of safely negotiating a 4 meter underpass while operating at highway speeds and tires at highway pressure with an empty 8’X8’X20’ foot ISO container.

S.3.8 Transportability. Be transportable at GCW with 8x8x20 ISO container by C5 (C17 Desired) aircraft, rail, and marine modes. The FMTV-LHS vehicle and companion trailer shall be transportable empty on separate C130 aircraft. Additionally, one LHS unloaded with one 8x8x20 container shall be simultaneously C130 transportable (Desired).

S.3.9 Transloading of Payload. It is desired that the LHS vehicle shall be capable of directly transloading payload from/to the vehicle to/from C-130 (or larger) aircraft without the use of an additional MHE.

S.3.10 Operating Pressures and temperatures. The maximum operating oil pressure for operating the hydraulic systems shall be 300 bars. The system shall be capable of operating in environmental temperatures ranging from 120° F to minus 25° F using the hydraulic oil used on the FMTV without kits or preparation. With special arctic kits, The LHS shall be able to operate in temperatures down to minus 50° F.

S.3.11 Slave Hydraulics. Self-sealing quick disconnect hydraulic couplings and one hose with appropriate connectors shall be provided, such that one LHS vehicle can readily power the LHS system of another LHS vehicle with the use one hose. Hoses shall be at least 35 feet long (10.7 M) and stowed on the vehicle in a storage box. Tethered caps are required to protect the fittings. The female coupling shall be installed on the truck and the male coupling on the hose.

S.3.12 Hydraulic System and Controls. Integrated within the hydraulic system shall be the necessary hydraulic cylinder(s), strainer(s), filter(s), reservoir(s), pressure relief valve(s), and all necessary lines, lockout(s), restrictor(s), and control valve(s) to insure positive and safe control of all operations and to provide protection in the event of a hydraulic power failure. The hydraulic filters and strainers shall be located so as to provide direct access and to allow removal without causing damage to the truck. Bypasses shall be furnished where necessary to protect filters during cold temperature operation. A means shall be provided for bleeding all air trapped in the hydraulic system. In the event of a system hydraulic failure during loading or unloading, a release mechanism (s) is required to safely offload the flat-rack to the ground, or to load the flat-rack to the truck or trailer. All cylinder rods, which shall be exposed during operations, shall have a hard chromium plating with a crack-free thickness sufficient to pass the porosity test of QQ-C-320. Cylinder rod chromium plating shall not be exposed when the LHS is not in use. All high pressure hydraulic hoses and fittings shall be capable of withstanding a bursting test pressure of four times the working pressure and proof pressure of at least two times the working pressure. High pressure hydraulic hoses shall have the physical qualities equivalent to or shall be capable of operation of OE-10, OE/HDO-10, Grade 10 oil conforming to QPL-2104 and OEA under Arctic Conditions. There shall be no leakage of hydraulic fluid past couplings or seals at maximum load and speed within the operational conditions cited herein.

S.3.13 LHS Truck Reliability. The LHS Truck shall meet the reliability requirements of Para. 3.2.3 Reliability, Table I.

DRAFT ANNEX S

LOAD HANDLING SYSTEM (LHS)

S.4.0 General Test Requirements

S.4.1 Load Handling System: To determine conformance to paragraph S. 3.0, the Load Handling System (LHS) and companion trailer shall be tested at a Government proving ground. The LHS system shall be capable of transporting, loading and unloading payload modules, flat racks, medical shelters and 20-foot ISO containers and other loads as defined in S.2.1.1 and by the specific requirements of this Annex. Some of the key features of the LHS to be tested are, Hook Arm System (HAS), Load Handling Unit (LHU), Rear Roller Assembly (RRA), and Operating Controls.

S.4.1.1 Hook-Arm System (HAS). To determine conformance to S.3.1.1, the HAS assembly and operating/control systems, shall be tested to verify it can safely guide and lift the loading and unloading of payload modules (See S.2.1.1) using a chassis mounted rear assembly.

S.4.1.2 Rear LHS/LHU Roller-bed Assemblies. To determine conformance to paragraph S.3.1.2, the transversely rear mounted roller bed assemblies shall be subjected to performance testing to ensure the operator can configure the LHS/LHU as specified in S.3.1.2. Testing shall include validation of the twist locks and front restraints required for securing the ISO container for transit. The LHS/LHU rear roller assembly shall be checked to ensure it easily configurable by the driver between the STANG 2413 & ISO configurations.

S.4.1.3 Load Handling Unit (LHU). To determine conformance to S.3.1.3 the LHU shall be operationally tested to ensure it can safely handle those ISO containers and shelters, specified in S.2.1.1, with the least amount of tilt.

S.4.1.4 Load Handling Unit Lift Frame (LHULF). To determine conformance to paragraphs S.3.1.3 and S.3.1.4, the interface between the LHU and LHULF shall be inspected to ensure the frame is adaptable to both 8ft & 8.5 ft. modules and capable of being transported on the HAS using guides/locating assemblies and locks to securely attach it to the ISO modules.

S.4.1.4.1 LHULF Stowage. The LHULF assembly shall demonstrate the capability of being stowed when not in use and readily transferable to/from stowage to the operating position for handling ISO modules by one operator, as specified in S.4.1.4. The stowage height and width dimensions shall not exceed air, ground or sea transportability requirements

S.4.1.5 Lifting Frame Stowage Assembly. To determine conformance to S.3.1.5 the stowage assembly shall be tested to ensure that the safety interlocks function during ground stowage operations. And that the maximum height does not interfere with transportability when stowed.

S.4.1.6 Cab Mounted Components. To determine conformance to S.3.1.6, the cab mounted components shall be evaluated to ensure all load handling systems functions have been integrated into the control box, and that safety warning devices operate as required by S.3.1.6.

S.4.1.7 Operating Circuits & Control System. To determine conformance to S.3.1.7, the operating system shall be evaluated to ensure that the vehicle's driver, while seated in the driver's seat, is able to operate the primary controls for pick-up and release of the designated payload modules as specified.

S.4.1.8 Alternate/ Back-up Mechanism for Emergencies: To determine conformance to paragraph S.3.1.8, the emergency back-up mechanism shall be evaluated to ensure it can safely lower payload modules in the event of system electric/hydraulic failure.

S.4.2 Unloading and Loading Requirements: To determine conformance to paragraph S.3.2, the LHS system shall demonstrate it's ability to engage, lift, load and unloading payloads as specified.

S.4.2.1 Self-load/off-load: To determine conformance to S. 3.2.1 and S.3.2.2, the self-load/off-load operations shall be evaluated to ensure a crew of one soldier can perform all of the specified operations without dismounting, and perform the stowage operations within the required/desired time span.

S.4.2.2 Self Load/off-load. See S.4.2.1 and Table IV for verification method.

S.4.2.3 Loading & Off-loading Time: To determine conformance to S.3.2.3, demonstrations shall be conducted to ensure the specified times will not be exceeded for loading and off-loading, transferring and securing specified payload modules. The time shall begin when the LHS is activated and payload is attached, and shall end when the payload module is secured.

S.4.2.4 Primary and Auxiliary Controls: To determine conformance to S.3.2.4, the primary and auxiliary controls shall be evaluated to ensure a seated driver, using vehicle mirrors, can operate the primary controls inside the vehicle and by an operator, standing outside the vehicle, using the auxiliary LHS controls for pick-up and release of flat-racks/ISO containers.

S.4.2.5 LHS Vehicle Loading Height: To determine conformance to S.3.2.5, the vehicle loading height shall be measured and shall not exceed 177.2 inches (4.5M).

S.4.2.6 Manual Hydraulic System Operation. To determine conformance to S.3.2.6, the manual hydraulic system shall be functionally tested to safely lower fully loaded flat-racks and ISO containers to the ground in the event of system hydraulic failure.

S.4.2.7 Flat-rack Locking. To determine conformance to S.3.2.7, the flat-rack locking system shall be evaluated for it's ability to secure the flat-rack during rough terrain operations including a means of manually unlocking the flat-rack in the event of a hydraulic system failure.

S.4.3 Transfer Conditions. To determine conformance to S.3.3, the Hook Arm Assembly shall be tested to ensure it is capable of transferring the payload modules as DESIRED
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S.4.4 LHS Overload. To determine conformance to S.3.4, the hydraulic system shall be tested to ensure that the it is equipped with a 10% overload safety mechanism and warning light to prevent the internal or external operator from picking up overloaded payloads. The warning light shall be located in the cab and in plain view of the driver/operator.

S.4.5 Retrograding. To determine conformance to S.3.5, the retrograding system shall be evaluated as specified.

S.4.6 Towing. To determine conformance to S.3.6, the towing capability of the LHS shall be tested on a companion trailer containing a maximum payload identical to that of the LHS truck. The towing device and support structure shall be evaluated to ensure that a single operator can hook up to any FMTV compatible lunette style trailer as specified. The towing device shall be able to withstand the maximum towing loads without failure or permanent deformation.

S. 4.6.1 Turning (FMTV-LHS truck trailer combination). To determine conformance to paragraph S.3.6.1, a fully loaded FMTV-LHS truck and trailer combination shall demonstrate the capability of negotiating a 90-degree intersection of two twenty foot wide roadways, wall-to-wall, in a single pass.

S.4.7 On Road Requirements. To determine conformance to S.3.7, the LHS shall demonstrate the ability of negotiating a 4-meter underpass as specified.

S.4.8 Transportability To determine conformance to S.3.8, the LHS and companion trailer shall be evaluated for transportability as specified.

S.4.9 Trans-loading of Payload. To determine conformance to S.3.9 the vehicle shall demonstrate it's capable of transloading payload from/to the vehicle to/from C-130 (or larger) aircraft without the use of an additional MHE.

S.4.10 Operating Pressures and Temperatures.To determine conformance to S.3.10, operating pressures and temperatures shall be evaluated as specified.

S.4.11 Slave hydraulics. To determine conformance to S.3.11, the slave hydraulic system shall be tested and measured to the specified requirements.

S.4.12 Hydraulic System Controls. To determine conformance to S.3.12, the hydraulic system shall be inspected and tested as specified.

S.4.13 LHS Truck Reliability. When required by contract, the LHS Truck shall demonstrate the required reliability (ref. S.3.13) during government testing IAW Table II of the ATPD (Base Document) and Table IV (S.4.16) of this annex (Annex S).

S. 4.14 Verification

S. 4.14.1 Methods of verification

S. 4.14.2 Test. A procedure or process to obtain or verify data, through systemic operation of the end item under appropriate conditions, with or without instrumentation, and the collection, analysis, and evaluation of quantitative data.

S. 4.14.3 Analysis. Verification shall be accomplished by technical or mathematical evaluation, mathematical models, simulations or other sources.

S. 4.14.4 Examination. Verification shall be accomplished by visual and/or dimensional examination of the end item or its components, reviewing descriptive documentation, certifications, and or comparing characteristics to established criteria.

S. 4.14.5 Demonstration. Verification shall be accomplished by appropriate functional checks and or/operation of the end item or its components.

S. 4.14.6 Certification. A document-certifying conformance to a specific requirement or standard signed by the certifying official or responsible party. When required by contract or this specification, certifications may be used in lieu of additional verification methods and must include supporting documentation (test data, material analysis, etc.).

S. 4.15 Classes of Verification.

S. 4.15.1 First Article Test. When required by contract, this test consists of a first production vehicle inspection and Production Verification Test (PVT).

S. 4.15.1.1 First Production Vehicle Inspection (FPVI). A Government Inspection of the first vehicle produced under contract, usually performed at the place of manufacturer, utilizing one or more of the verification methods referenced in paragraph S.4.13.

S.4.15.1.2 Production Verification Test. A test of the end item conducted by the Government and performed at a government test site to establish product conformance to requirements and production capability.

S. 4.15.2 Follow-on Production Test. A test of the end item similar to Production Verification Test, but more limited in scope, to assess continued conformance to requirements and production capability.

S. 4.15.3 Quality Conformance Inspection. A final inspection of the end item performed before Government acceptance of a production vehicle utilizing a Final Inspection Record. The Final Inspection Record is a quality record, which documents all verification actions performed on production vehicles, both in-process and at final assembly, with documented results and corrective action.

S. 4.15.4 Control Test. When required by contract, control tests for maintaining and evaluating process control shall be conducted by the contractor as referenced in Table IV. This test is performed on selected vehicles after completion of

Quality Conformance Testing.

S. 4.16 Verification Matrix. The following Table (IV) displays the verification method and event for each applicable Section 3 Requirement. All verifications referenced in this table may be performed when required by contract and modified at the discretion of the Government by deletion or addition of items listed to assure conformance to specification and or contractual requirements.

TABLE IV – VERIFICATION MATRIX

VERIFICATION LOCATION INDEX

First Article Test (FAT)	Manufactures Facility
First Production Vehicle Inspection (FPVI)	Manufacturers Facility
Production Qualification Test (PQT)	Government Test Site
Follow-on Production Test (FPT)	Government Test Site
Quality Conformance Inspection (QCI)	Manufacturers Facility
Control Test (CT)	Manufacturers Facility

TABLE IV – VERIFICATION MATRIX

		VERIFICATION METHOD						VERIFICATION EVENT				
SECTION 3 PARAGRAPH NUMBER	SECTION 3 PARAGRAPH TITLE	TEST	ANAL	EXAM	DEMO	CERT		FPVI	PVT	QCI	FPT	CT
S.3.1.1	Hook-Arm System (HAS)	X						X	X			
S.3.1.2.	Rear LHS/LHU Roller-Bed Assemblies	X			X			X	X			
S.3.1.3	Load Handling Unit (LHU)	X		X	X				X			
S.3.1.4	Load Handling Unit Lift Frame (LHULF)	X			X			X	X			
S.3.1.4.1	LHULF Stowage	Same as S.3.1.4										
S.3.1.5	Lifting Frame Stowage Assembly	X		X	X			X	X			

S.3.1.6	Cab Mounted components	X			X	X		X	X			

TABLE IV – VERIFICATION MATRIX

		VERIFICATION METHOD						VERIFICATION EVENT				
SECTION 3 PARAGRAPH NUMBER	SECTION 3 PARAGRAPH TITLE	TEST	ANAL	EXAM	DEMO	CERT		FPVI	PVT	QCI	FPT	CT
S.3.1.7	Operating Circuits & Control System	X			X	X		X	X			
S.3.1.8	Alternate Back-up Mechanism for Emergencies	X			X	X		X	X			
S.3.2	Ground Unloading and Loading Operations	X			X				X			
S.3.2.1	Self-load/Off-Load (Single operator)	X			X				X			
S.3.2.2	Self-load/Off-load	Same as S.3.2.1										
S.3.2.3	Loading and Off-loading Time	X			X				X			
S.3.2.4	Primary and Auxiliary Controls	X			X			X	X			
S.3.2.5	LHS Vehicle Loading Height	X		X	X			***X***	X			
S.3.2.6	Manual Hydraulic System Operation	X			X			X	X			
S.3.2.7	Flat-rack locking	X			X			X	X			
S.3.3	Transfer Conditions	X			X			X	X			

S.3.4	LHS Overload	X			X			X	X			
S.3.5	Retrograding	X			X				X			
S.3.6	Towing	X	X	X	X	X			X			
S.3 .6.1	Turning (FMTV-LHS Truck Trailer Combination)	X			X			X	X			
S.3.7	On Road requirements	X			X				X			
S.3.8	Transportability	X		X	X				X			
S.3.9	Trans-loading of Payload	X			X				X			
S.3.10	Operating Pressures and Temperature	X				X		X	X			
S.3.11	Slave Hydraulics	X		X	X			X	X			
S.3.12	Hydraulic System Controls	X	X	X	X	X		X	X			

DRAFT ANNEX T
COMPANION TRAILER TO THE FMTV – LHS

T.1.0 This annex covers the MTV cargo trailer for the FMTV-LHS system. The trailer shall be a wagon type with a steerable front axle.

T.2.0 General Requirements. The trailer shall be pintle towed and compatible with the FMTV-LHS truck and other military vehicles at the appropriate towed load of the prime mover but not exceeding the capacity of the trailer. The Companion trailer system shall interface with the systems (electrical, mechanical, pneumatic and/or hydraulic) of the FMTV-LHS as needed. The trailers shall have compatibility with the FMTV-LHS truck to facilitate the loading, unloading and securing of the Payload Modules, flat racks and 20-foot ISO containers (same as LHS truck). The trailer shall be capable of operating and withstanding the same on road and off road conditions as the FMTV using only the LHS truck driver/operator.

T.3.0 Specific Requirements.

T.3.1. Performance Requirements. The trailer shall meet the performance characteristics as specified herein at GCW when coupled to the FMTV-LHS truck.

T.3.1.1 Lateral Stability. The trailer, with full payload at a CG of 24 inches (61 cm) above the bed height, shall sustain a minimum of 0.4g acceleration without overturning or experiencing liftoff of any trailer wheels while operating on a flat, dry, and level surface.

T.3.1.2 Tracking and Turning.

T.3.1.2.1 Tracking. The trailers shall conform to the tracking requirements of FMCSR 393.70.

T.3.1.2.2. Turning. The trailer, while coupled to the FMTV-LHS operating in its minimum tracking circle forward, shall track right and left without damage to the trailer or the FMTV-LHS truck and without interference between the truck and the trailer or any combination of payload modules. Shall be capable of negotiating a 90-degree intersection of two 24-foot wide (18-foot wide - Desired) roadways, wall-to-wall, in a single pass.

T.3.1.3. Backing. (LHS truck-trailer combination). Shall be capable of being backed safely from any normal position (such as when in a turn but not from full jackknife) without damage to truck, trailer, or payload, and without necessity for operator dismounting or other preparation.

T.3.1.4. Coupling/Uncoupling. The trailer shall be capable of being coupled/uncoupled by one person and capable of standing on both hard and soft surfaces when fully loaded and not attached to the LHS truck.

T.3.1.5 Speeds. The trailer at all permissible loads shall be capable of operating at speeds specified for the FMTV in all on/off road conditions without damage or interference.

T.3.1.6. Fording. The trailer shall be capable of operating in both fresh and salt water in depths of at least 30 inches (76cm) without preparation. Fording operations shall not result in degradation of trailer components nor render the trailer incapable of performing all operations of this specification. Excepted are non-sealed brake components requiring drying time.

T.3.1.7. Braking. Trailer shall be equipped with an Anti-lock Braking system (ABS).

T.3.1.7.1. Service Brakes. Trailer shall be equipped with service brakes. The combined truck and trailer service brakes shall control and hold the vehicle combination on a dry, hard surfaced 30% grade when headed up or down slope.

T.3.1.7.2. Parking Brakes. Manually activated parking brakes shall hold the trailer with full payload on dry, hard, smooth surfaced 30% grade while uncoupled from the towing vehicle headed up or down grade.

T.3.1.7.3 Emergency Brakes. The trailer brake system shall include an emergency breakaway feature. This feature shall apply emergency brakes when the air supply from the prime mover ceases. When activated the brakes shall be sufficient to hold the fully loaded trailer on a dry, hard, smooth surfaced 30% grade while headed up or down grade.

T.3.1.8. Approach and Departure Angle. The approach and departure angles shall be as great as practical to optimize truck/trailer mobility. Storage box and other trailer components shall be mounted on the trailer in locations that do not reduce the trailer approach or departure angle.

T.3.1.9. Ground Clearance. The trailer shall have a ground clearance at least equal to the under axle clearance of the FMTV-LHS truck.

T.3.1.10. Trailer Payload. The trailer shall be capable of carrying securely 20-foot long ISO shelters/containers of 8 ft and 8.5 ft height, and Medical Shelters conforming to ISO 668 Type 1CC and 1C, weighing 7.5 tons (8.5 tons Desired) without the use of a flatrack. And M1, M1077, and STANAG 2413 flatracks, the M3 Container Roll On/Off Platform (CROP) flatrack (i.e. NATO Standard demountable cargo bed), weighing not less than 2 tons with not less than 5 tons of any class of supply as payload in both on-road and off-road conditions. The trailer shall be capable of having loaded/unloaded flat racks, ISO shelters/containers without flat rack, and LHS compatible modules vertically emplaced onboard, secured for transport, and removed by means of a suitably rated crane, other MHE, or the LHS. The trailer shall properly sustain the maximum gross vehicle weight (GVW) stated herein.

T.3.1.10.1. Payload Type.

Flatracks. M1 and M1070 Flatracks: These are 20 ft x 8 ft cargo carrying pallets with interface and locking dimensions in accordance with STANAG 2431.

CROP. M3 and M3A1 Flatracks. These are cargo carrying platforms suitable for LHS type use.

ISO Containers: Standard 20 foot long ISO containers that may be of 8 ft. to 8.5 ft. in height.

Medical Shelters: 20 ft. long Expandable Medical Shelters made from Aluminum, similar in size to the 20 ft. ISO Container.

T.3.1.11. Trailer Recovery. The trailer shall have provisions for being recovered with full payload from the rear.

T.3.2. Mobility Degradation. The trailer shall cause no decrease in mobility of the FMTV-LHS truck-trailer combination (Desired).

T.3.3. Compatibility. Shall be fully compatible with PLS and HEMTT-LHS trucks at the FMTV-LHS companion trailer required payload.

T.3.4. Transportability. Trailers shall be transportable by C-130 and C-141 as a single unit (stacked – desired) and by C-5 and C-17 aircraft, marine, and rail when stacked as a vertical unit of two trailers. Not more than 30 minutes shall be required for preparation for shipment. It is desired that the trailer be capable of transloading payload from/to the prime mover to/from C-130 (or larger) aircraft without the use of an additional MHE.

T.3.5. Reliability and Maintainability. The LHS Trailer shall meet the reliability requirements of Para. 3.2.3 Reliability, Table I.

T.3.6. Physical Characteristics.

T.3.6.1. Dimensions. The trailer dimensions for worldwide operation and transportability shall not exceed the following.

WIDTH: 96 in, (244 cm)

LENGTH: The overall length of the truck and trailer in normal operating condition shall not exceed 60 ft.

HEIGHT: The trailer shall be capable of negotiating a four meter underpass when transporting an empty ISO (8x8x20 ft.) shelter/container or mission module not flatrack mounted.

T.3.6.2. Load sensors. The trailer shall incorporate sensors that indicate to the operator that the load exceeds the rated capacity of the vehicle.

T.3.6.3. Protective Coating. The trailers shall have the same protective coating as the FMTV trucks.

T.3.6.4. Suspension and Axles. The FMTV-LHS trailer shall be a wagon type (with 2 or 3 axles) the front axle being steerable. Under static load conditions, the entire load of the trailer including the payload is distributed and carried by the trailer axles, and the only load on the pintle hook of the truck from the trailer is that of the trailer tongue itself. Axle spacing shall be a minimum of 48 inches (122 cm) to meet C130 aircraft loading requirements. All suspension components shall have rated capabilities at least equal to the maximum load at GVW that can be imposed on each member at the ground. The suspension design shall limit the vertical natural frequency of the spring mass to the extent feasible within the performance parameters of this specification.

T.3.6.5. Wheels, Rims and Tires. Trailers shall be equipped with single radial tires. To optimize trailer stability, and minimize deck height, commonality of tires with the FMTV-LHS truck is not required (though desirable). A spare tire and wheel, and tire carrier shall be furnished with each trailer if not common with the truck. Rim and tire rating shall conform to FMVSS 119 and SAE or tire and rim association recommendations for type and size tires furnished. Tires shall be repairable and replaceable at organizational level. Special tools must be identified. Tire carrier, if required, shall meet operator requirements of this specification. Tire wear life shall be 10,000 miles (more desired) of the OMS/MP use while transporting a NATO demountable cargo bed (i.e. flat-rack/container Roll-On/Off Platform (CROP)) weighing not less than 2 tons with not less than 5 tons of any class of payload. Lug nuts shall be compatible with the LHS truck.

T.3.6.6. Brake System Hoses, Fittings and Couplings. Air lines and hoses shall conform to FMVSS 106, supply air for braking and be permanently attached by threaded fittings to the trailer. No pulling or kinking of lines shall occur throughout the articulation range between the towing and towed vehicles. Couplers shall comply with SAE J318 and compatible with A-A-52484 couplers. They shall be identified by tags conforming to A-A-52483 service and emergency. Dummy couplers shall be provided for storing air lines when not in use.

T.3.6.7. Electrical. Trailer electrical system shall be 12 volt with 24 volt military adaptations defined below. Lighting shall meet all requirements of FMVSS 108 when trailer is transported loaded or unloaded.

T.3.6.7.1. Receptacle System, 12/24 volt. The trailer shall be equipped with one 12-contact receptacle with cover and one 7-contact receptacle with cover installed at front of trailer. The 12-contact receptacle shall conform to MS 75021-1 and be equipped with cover assembly conforming to ordnance drawing 7731428. The 7-contact receptacle shall conform to SAE J560 round socket for jumper cable. The 12-contact receptacle shall be provided with resistance to each circuit to reduce the voltage of a tactical military design towing vehicle from 24 volts to 12 volts. The 7-contact socket shall be wired in accordance with SAE J560 to supply 12 volts directly to the trailer circuits. All electrical connectors bodies, pins, and contacts shall be made of

corrosion resistant material. Connectors shall allow for multiple disconnection and reconnections without damage.

T.3.6.7.2. Blackout Lighting. Trailers shall be equipped with blackout stop and tail lights.

T.3.6.7.3. Reflectors. Reflectors and mounts shall be IAW FMVSS 108.

T.3.6.7.4. Connecting cable, Electrical inter-vehicular. Each trailer shall be provided with a 12-pin military cable of sufficient length to reach the towing vehicle without interference during operation. Each vehicle shall maintain the ability to accept the 7-pin commercial or the 12-pin military type cables.

T.3.6.8. Storage Box. A fully enclosed weatherproof storage box shall be provided to store BII and any special equipment. The box shall have a hinged door with appropriate latch to secure the door closed by padlock. The box shall be fully accessible with the trailer loaded or unloaded.

T.3.6.9. Trailer Deck. The trailer shall be capable of being easily loaded (unloaded) with any of the payloads (ISO Containers or, Flatrack or CROP) and be able to switch between the type of payloads with minimal difficulty. The rollers/carriers/guides on the trailer shall be so designed that they will accept all the payload modules without interference.

DRAFT ANNEX T
COMPANION TRAILER TO FMTV-LHS

T.4.0. General Test Requirements

T.4.0.1. Load Handling System (LHS) Companion Trailer: To determine conformance to paragraphs T.2.0 and T.3.0, the LHS companion trailer shall be tested at a Government proving ground. The companion trailers shall be capable of transporting, loading and unloading payload modules, and other loads as defined by the specific requirements of this Annex. One of the key features of the companion trailer will be its ability to withstand the same on road/off road conditions as the FMTV-LHS prime mover.

T.4.1 Specific Requirements

T.4.1.1 Lateral Stability. To determine conformance to paragraph T.3.1.1, the trailer shall be subjected to cited lateral acceleration without overturning or experiencing liftoff of any trailer wheels.

T.4.1.2.1. Tracking Test. To determine conformance to paragraph T.3.1.2.1, the trailers shall be tested for the tracking requirements of FMCSR 393.70.

T.4.1.2.2. Turning Test. To determine conformance to paragraph T.3.1.2.2, the trailer coupled to the FMTV-LHS prime mover shall be operated at minimum forward tracking circle in both the right and left directions. The turning test shall be conducted in all combinations of both prime mover and trailer loaded and without load. During tracking in both right and left directions, the trailer shall be checked for interference and/or damage to the prime mover or itself.

T.4.1.3. Backing. To determine conformance to paragraph 3.1.3, the trailer shall demonstrate backing up capabilities as specified.

T.4.1.4. Coupling/Uncoupling Test. To determine conformance to paragraph 3.1.4, During initial and comparison testing, the trailer coupling/uncoupling shall be evaluated for ease of operation by one person.

T.4.1.5. Speed Test. To determine conformance to paragraph 3.1.5, the trailer coupled to the FMTV-LHS truck shall be operated at the specified speeds in all on and off road conditions. During initial production testing, the trailer shall be examined for damage or indications of interference.

T.4.1.6. Fording Test. To determine conformance to paragraph T.3.1.6, the trailer shall be operated without preparation at the depth specified. After fording and during durability testing, the trailer shall be examined for component failure or degradation due to water contamination.

T.4.1.7. Braking Tests. Anti-lock Braking System (ABS).

T.4.1.7 1. Service Brake Test/Certification: During Production Verification (PVT) , Control Tests and Comparison Testing the service brakes shall be tested to determine conformance to paragraph T.3.1.7.1 The service brakes at GVW shall have the ability to control and hold the combined prime mover and trailer on the maximum specified grade in the ascending and descending position without special preparation. The contractor shall certify that the prime mover and trailer service brakes, under all loading conditions, meet the combined stopping distances of the appropriate FMVSS requirement for the type of brake system used.

T.4.1.7.2. Parking Brake Test. During Production Verification Testing (PVT) and comparison tests, conformance to paragraph T.3.1.7.2 shall be demonstrated at specified gross trailer weight, without special preparation. The trailer shall be fully loaded on dry, hard, smooth surface road, on a 30% grade. While uncoupled from towing vehicle, the manually applied parking brakes shall hold the trailer motionless, headed both up and down slope.

T.4.1.7 3. Emergency Brake Test. Testing shall be conducted on the emergency breakaway feature to determine conformance to paragraph 3.1.7.3. The emergency breakaway feature shall be capable of activating the emergency brakes when the air supply from the prime mover ceases. When activated the breaks shall be sufficient to hold the fully loaded trailer on dry, hard, smooth surfaced road on a 30% grade while headed up or down grade.

T.4.1.8. Approach and Departure Angle Check. To determine conformance to paragraph T.3.1.8. the angle of approach and departure shall be measured for compatibility with the FMTV-LHS prime mover.

T.4.1.9. Ground Clearance Check. To determine conformance to paragraph T.3.1.9, the trailer shall be measured for minimum ground clearance under the axles and compared to the under axle ground clearance of the FMTV-LHS prime mover.

T.4.1.10. Trailer Loading Test. To determine conformance to paragraph T.3.1.10, during testing at Government proving ground the trailers shall be evaluated for the ability to accept and transport all payload modules specified in both on road and off road conditions.

T.4.1.11. Trailer Recovery. To determine conformance to paragraph T.3.1.11 the trailer shall be inspected for recovery provision(s) and tested at a Government proving ground to ensure compliance to the recovery requirement.

T.4.2. Mobility Degradation. To determine conformance to paragraph T.3.2, the trailer shall be evaluated for mobility degradation of the FMTV-LHS truck-trailer combination (Desired).

T.4.3. Compatibility. To determine conformance to paragraph T.3.4, the trailer shall be evaluated and tested for full compatibility with PLS and HEMTT-LHS trucks at the FMTV-LHS companion trailer required payload.

T.4.4. Transportability. To determine conformance to paragraph T.3.5, the trailer shall be evaluated for transportability as specified.

T.4.5. Reliability and Maintainability Verification. When required by contract, the LHS Trailer shall demonstrate the required reliability (ref. T.3.5) during government testing IAW Table II of the ATPD (Base Document) and Table T-I (T.4.9) of this annex (Annex T).

T.4.6.

T.4.6.1. Dimension Check. To determine conformance to 3.6.1, the trailer width shall be measured for worldwide operation and transportability. Measurements shall not exceed the following criteria:

- Width: 96 inches (244cm)
- Length: Overall length of the truck and trailer 60 ft (1829 cm)
- Height: The trailer shall be capable of negotiating a four meter underpass when transporting an empty ISO (8x8x20 ft.) shelter/container or mission module not flatrack mounted.

T.4.6.2. Load Sensors Test. To determine conformance to paragraph T.3.6.2. the load sensors shall be tested to ensure they are capable of alerting the driver when the rated capacity has been exceeded.

T.4.6.3. Protective Coating Check: To determine conformance to paragraph T.3.2.3, the trailer(s) Chemical Agent Resistant Coating System (CARC) shall be inspected to ensure that the coating system meets the minimum requirements of the FMTV referenced specification.

T.4.6.4. Suspension and Axles Check. To determine conformance to paragraph T.3.6.4, during testing at a Government Proving Ground, the trailer suspension shall be evaluated for performance parameters specified.

T.4.6.5. Wheel, Rims and Tires Check/Certification. To determine conformance to paragraph T.3.6.5, the trailer's wheels, rims and tires shall be checked for proper type ratings specified. The contractor shall certify that the rims and tire ratings conform to FMVSS 119.

T.4.6.6. Brake System Hoses, Fittings and Couplings Check. To determine conformance to paragraph T.3.6.6, the air hose fittings and their locations shall be checked for compliance to the requirements of SAE J702. The couplers shall be checked for compatibility with A-A-52484 couples. The couplers shall be checked for identification tags specified. The connectors and air lines shall be periodically inspected during Government proving ground tests to detect any pulling or kinking.

T.4.6.7. Electrical Check. To determine conformance to paragraph T.3.6.7, the electrical system shall be inspected to the requirements specified. The electrical system shall be checked to ensure protection from operational hazards during testing at government proving grounds.

During Quality Conformance Inspections, the trailers shall be checked for location, protection, condition, and coding of electrical wiring/harnesses.

T.4.6.7.1. Receptacle System (12/24-volt) Check. To determine conformance to paragraph T.3.6.7.1, specified receptacles shall be checked for conformance to MS, SAE, and drawing requirements specified. The 12 and 24 volt receptacles shall be tested for proper operation during testing at a Government proving ground.

T.4.6.7.2. Blackout Lighting Check. To determine conformance to paragraph T.3.6.7.2, the blackout stop and tail lights shall be checked.

T.4.6.7.3. Reflectors Certification. To determine conformance to paragraph T.3.6.7.3, the contractor shall certify that the trailer reflectors meet the mounting requirements of FMVSS 108.

T.4.6.7.4 Connecting Cable, Electrical Inter-vehicular, Check. To determine conformance to paragraph T.3.6.7.4, the cables shall be checked for sufficient length, interference, and the capability of connecting to 7 and 12 pin towing vehicle connectors during testing at Government proving ground.

T.4.6.8. Storage Box Test. To determine conformance to paragraph T.3.6.8, the storage box shall be checked for the design requirements specified. During Government proving ground testing, and after completing the maximum fording depth specified, the storage box shall be checked for the waterproofness requirement specified.

T.4.6.9. Trailer Cargo Bed Check. To determine conformance to paragraph T.3.6.10, the cargo beds shall be inspected for the requirements specified.

T. 4.7. Verification

T. 4.7.1 Methods of verification

T. 4.7.2 Test. A procedure or process to obtain or verify data, through systemic operation of the end item under appropriate conditions, with or without instrumentation, and the collection, analysis, and evaluation of quantitative data.

T. 4.7.3. Analysis. Verification shall be accomplished by technical or mathematical evaluation, mathematical models, simulations or other sources.

T. 4.7.4. Examination. Verification shall be accomplished by visual and/or dimensional examination of the end item or its components, reviewing descriptive documentation, certifications, and or comparing characteristics to established criteria.

T. 4.7.5. Demonstration. Verification shall be accomplished by appropriate functional checks and or/operation of the end item or its components.

T. 4.7.6. Certification. A document-certifying conformance to a specific requirement or standard signed by the certifying official or responsible party. When required by contract or this

specification, certifications may be used in lieu of additional verification methods and must include supporting documentation (test data, material analysis, etc.).

T. 4.8. Classes of Verification.

T. 4.8.1. First Article Test. When required by contract, this test consists of a first production vehicle inspection and Production Verification Test (PVT).

T. 4.8.1.2. First Production Vehicle Inspection (FPVI). A Government Inspection of the first vehicle produced under contract, usually performed at the place of manufacturer, utilizing one or more of the verification methods referenced in paragraph T.4.13.

T.4.8.1.2. Production Verification Test. A test of the end item conducted by the Government and performed at a government test site to establish product conformance to requirements and production capability.

T. 4.8.2. Follow-on Production Test. A test of the end item similar to Production Verification Test, but more limited in scope, to assess continued conformance to requirements and production capability.

T. 4.8.3. Quality Conformance Inspection. A final inspection of the end item performed before Government acceptance of a production vehicle utilizing a Final Inspection Record. The Final Inspection Record is a quality record, which documents all verification actions performed on production vehicles, both in-process and at final assembly, with documented results and corrective action.

T. 4.8.4. Control Test. When required by contract, control tests for maintaining and evaluating process control shall be conducted by the contractor as referenced in Table T-I. This test is performed on selected vehicles after completion of
Quality Conformance Testing.

T. 4.9. Verification Matrix. The following Table (T-I) displays the verification method and event for each applicable Section 3 Requirement. All verifications referenced in this table may be performed when required by contract and modified at the discretion of the Government by deletion or addition of items listed to assure conformance to specification and or contractual requirements.

TABLE T-I – VERIFICATION MATRIX

VERIFICATION LOCATION INDEX

First Article Test (FAT)	Manufactures Facility
First Production Vehicle Inspection (FPVI)	Manufacturers Facility
Production Verification Test (PVT)	Government Test Site
Follow-on Production Test (FPT)	Government Test Site

Quality Conformance Inspection (QCI) Manufacturers Facility
Control Test (CT) Manufacturers Facility

TABLE T-1 – VERIFICATION MATRIX
LHS COMPANION TRAILER

		VERIFICATION METHOD						VERIFICATION EVENT				
SECTION 3 PARAGRAPH NUMBER	SECTION 3 PARAGRAPH TITLE	TEST	ANAL	EXAM	DEMO	CERT		FPVI	PVT	QCI	FPT	CT
T.3.1.1	Lateral Stability	X			X			X	X			
T.3.1.2.1	Tracking	X			X	X		X	X			
T.3.1.2.2	Turning	X		X	X			X	X			
T.3.1.3	Backing	X			X			X	X			
T.3.1.4	Coupling/ uncoupling	X			X			X	X			
T.3.1.5	Speeds	X			X				X			
T.3.1.6	Fording	X			X			X	X			
T.3.1.7	Braking	X			X	X		X	X			
T.3.1.7.1	Service Brakes	X			X			X	X			
T.3.1.7.2	Parking Brakes	X			X			X	X			
T.3.1.7.3	Emergency Brakes)	X			X			X	X			
T.3.1.8	Approach and Departure angle	X			X			X	X			

TABLE T-I – VERIFICATION MATRIX
LHS COMPANION TRAILER

		VERIFICATION METHOD						VERIFICATION EVENT				
SECTION 3 PARAGRAPH NUMBER	SECTION 3 PARAGRAPH TITLE	TEST	ANAL	EXAM	DEMO	CERT		FPVI	PVT	QCI	FPT	CT
T.3.1.9	Ground Clearance	X		X	X			X	X			
T.3.1.10	Trailer payload	X			X				X			
T.3.1.11	Trailer Recovery	X			X				X			
T.3.2	Mobility Degradation	X			X				X			
T3.3	Compatibility	X			X				X			
T.3.4	Transportability	X			X	X			X			
T.3.5	Reliability and Maintainability	X		X	X				X			
T.3.6.1	Dimensions	X		X					X			
T.3.6.2	Load Sensors	X			X	X			X			
T.3.6.3	Protective Coating	X		X	X			X	X			
T.3.6.4	Suspension And Axles	X		X	X	X		X	X			
T.3.6.5	Wheels Rims And Tires					X		X	X			
T.3.6.6	Brake System Hoses Fittings And Couplings	X		X	X	X		X	X			
T.3.6.7	Electrical	X			X	X		X	X			
T.3.6.7.1	Receptacle System	X			X	X		X	X			

T.3.6.7.2	Blackout Lighting	X			X			X	X			
T.3.6.7.3	Reflectors	X		X	X	X		X	X			
T.3.6.7.4	Connecting Cables	X			X			X	X			
T.3.6.8	Storage Box	X		X	X			X	X			
T.3.6.9	Trailer Deck	X			X				X			